

CHAPTER 3

DRAWING

Overview

Introduction	To realistically portray three dimensional objects on the surface of a sheet of two-dimensional paper requires skill and keen observation. All forms are one, or a combination of several basic forms: Forms have mass and take up space. You will refine your drawing ability as you develop your skills of observation by seeing objects in their most elemental form.
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Objectives	<p>The material in this chapter enables you to do the following:</p> <ul style="list-style-type: none">● Develop contour and mass in three-dimensional drawings.● Draw a solid foundation of basic shapes.● Visually evaluate complex items in terms of basic forms.● Recognize and avoid the most common errors of novice draftsmen.● Use a common unit of measure to size figure drawings in correct proportions.● Use gestures and body dynamics to suggest movement in a composition.
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Overview, Continued

In this chapter This chapter covers the following topics:

Topic	See Page
Basic Drawing	3-3
Contour Drawing	3-4
Gesture Drawing	3-10
Basic Shapes	3-11
Combining Forms	3-16
Basic Rendering Techniques	3-19
Figure Drawing	3-24
Figure Elements	3-36
Facial Features	3-42
Rendering Techniques for Figure Drawing	3-49
Expression	3-54
Settings	3-56

Basic Drawing

Introduction	Most of us doodle. We draw when we attempt explanations and words elude us. We sketch things to jog our memories later. Some of us draw for the pleasure of expression.. For those who draw seriously, contour, gesture drawing, and basic forms are three techniques for developing basic drawing skills.
Basic drawing	Drawing is comprised of five component skills involving the perception of edges, space, relationships, light and shadow, and the perception of the whole, or gestalt. Everyone draws, and how well one draws is a measure of how well-developed one's basic skills of perception are.
Advanced drawing	Drawing well requires all five basic skills with additional refinements. You develop imagination, creativity, sensitivity, and expression through techniques and your familiarity with media. The only way to progress in drawing is with constant practice.
Practice	With practice, you can easily imitate perceived edges, space, and relationships on paper. Duplicating light and shadow requires careful observation and critical analysis of the direction, intensity, and color of light and shadows cast by light. Observation also requires intimate knowledge of the surface characteristics of the object on which the light and shadows fall. Gestalt results from the development of the other four perceptual skills.
Traditional drawing skills	Most renown artists began by studying traditional art. After a foundation in traditional drawing techniques, experimentation and style freely develop. Picasso and Salvatore Dali are prime examples of artists with concentrated traditionalist backgrounds resulting in creative interpretations. A study of Picasso's preliminary sketches reveals his continued dependence on contour and gesture fundamentals.
Exercises	Time your drawings for each technique described in this chapter. Every three minutes, change your object or your viewpoint. Vary the timed intervals by reducing times to 1 or 2 minutes. These timed exercises develop perceptual and observation skills by coordinating your eyes and hands.

Contour Drawing

Introduction

Train your eyes to see shapes and contours and your hands to transfer what you see to paper. The strokes you make and the strokes you omit should economically convey perceived images. The six types of contour drawing are contour, blind, felt, cross, negative, and inversion contour.

Contour drawing

Contour drawing is the process of drawing the contours or outlines of objects. Such definitive outlines do not exist in nature but, a thorough knowledge of contour is necessary to realistically convey imagery and proportion. To draw in contour, study the object, then the paper surface. Draw what you have seen. Do not draw detail. Your drawings should appear as outlines. The more you practice, the better you are able to draw the shape and proportion of the object.

Figure 3-1 shows an example of a contour drawing of a telephone.

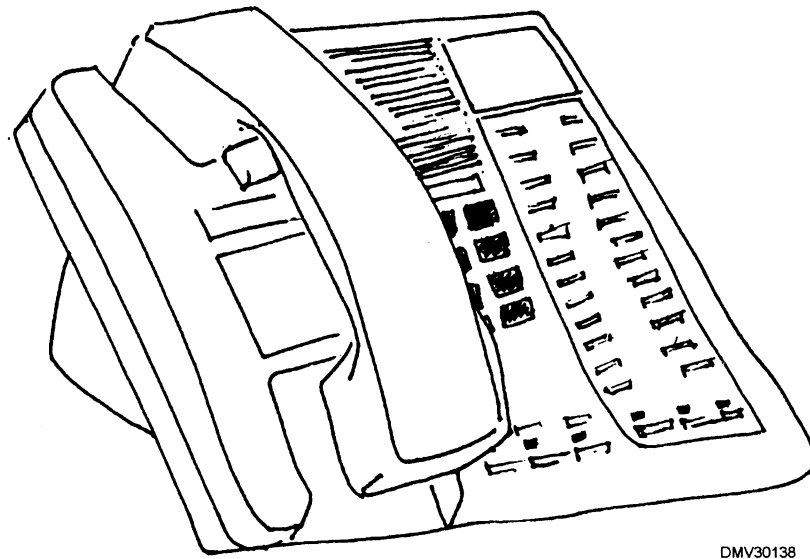


Figure 3-1.—A contour drawing of a telephone.

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Contour Drawing, Continued

Blind contour

Blind contour is also an outline drawing but, without the benefit of seeing what is drawn. To draw in blind contour, study the object only, not the paper. If you inadvertently look at the paper surface, stop drawing and do not continue until your eyes return to the object. Follow the contour of the object with your eyes. Make your hands draw without the benefit of looking at the paper. This drawing format develops coordination and seeing beyond the physical outline of the object.

Figure 3-2 is an example of a blind contour drawing of a telephone.

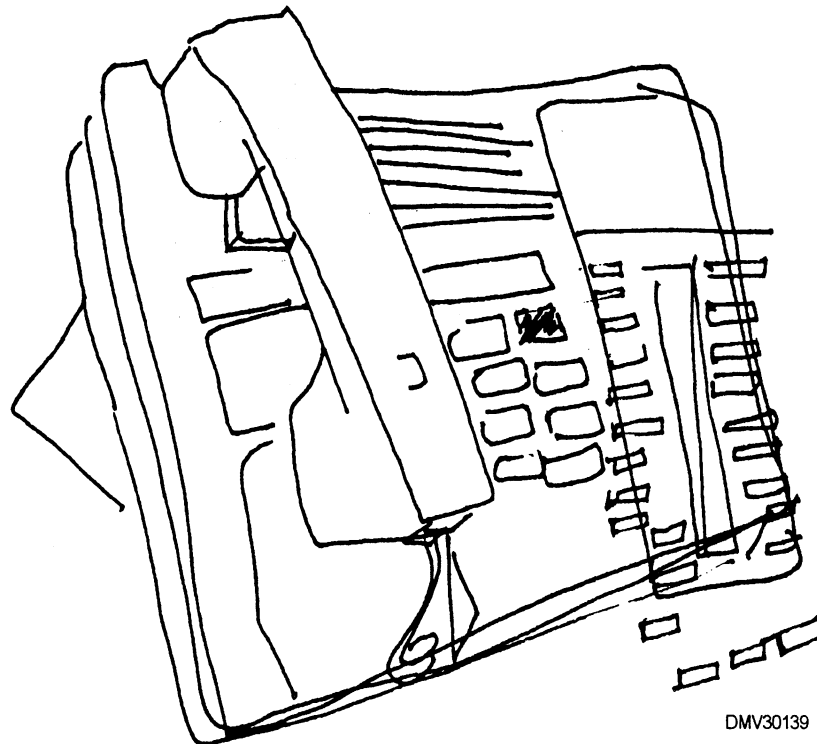


Figure 3-2.—A telephone in blind contour.

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Contour Drawing, Continued

Felt contour

Felt contour drawing is an outline that explores the surface characteristics of the object. This drawing format is called felt contour because you are drawing what your eyes perceive as the outline and texture of the object. To draw in felt contour, look at the object and close your eyes. Imagine the feel of the surface texture and outline of the object. With your eyes closed, draw the object on paper. The resulting drawing will be jagged and perhaps, illegible. This exercise in felt contour drawing develops perception.

Figure 3-3 is an example of felt contour drawing.

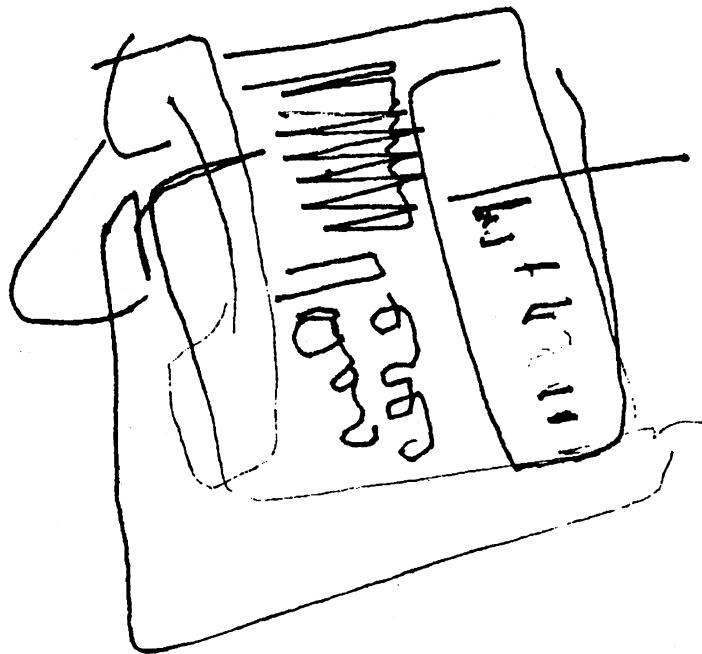


Figure 3-3.—Felt contour.

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Contour Drawing, Continued

Cross contour Cross contour is outline drawing of objects but, with topographical cross-hatching indicating surface characteristics and mass. To draw in cross contour, study only the object, not the paper surface for the outline. Draw the outline in blind contour. Draw in basic contour, vertical and horizontal lines that appear to lay on the surface of the drawn object compresses or expands to imply surface texture. This exercise also develops perceptions of edges and surface characteristics.

Figure 3-4 is an example of cross contour drawing of a telephone.

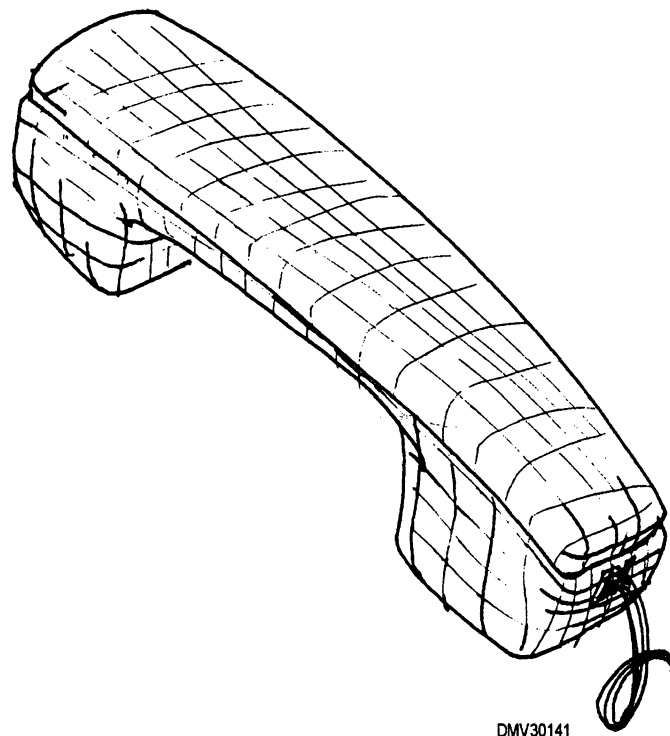


Figure 3-4.—A cross contour drawing of a telephone.

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Contour Drawing, Continued

Negative contour

Negative contour is drawing the outline of the negative space surrounding an object as opposed to a positive contour drawing of the object itself. To draw in negative contour, look at the shape of the space around the object. Draw the space without consciously drawing the object outline. Negative contour drawings suggest the presence of objects. Negative contour drawings develop a sense of space, not only the space the object occupies but also the space around the object and the object's relationships to other elements in the area.

Figure 3-5 is an example of a negative contour drawing.

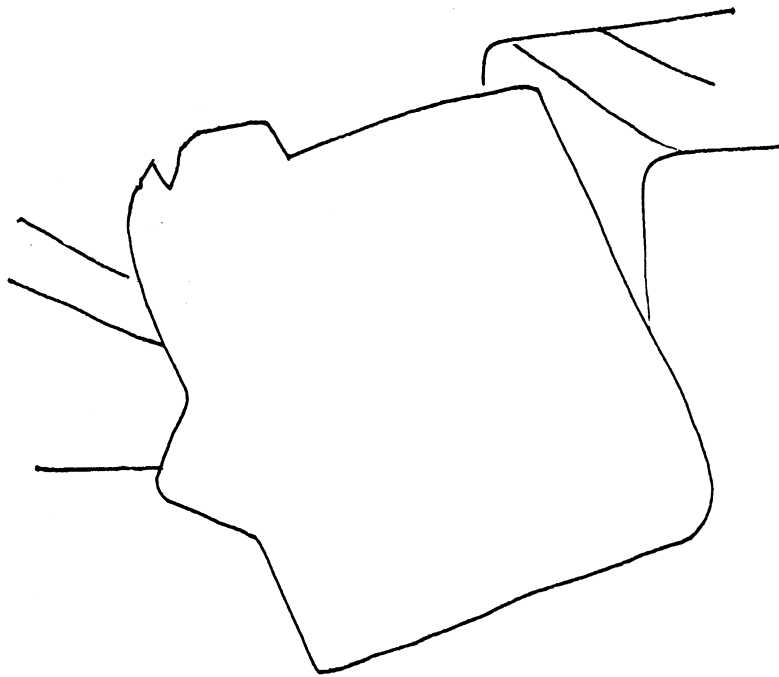


Figure 3-5.—A drawing of a telephone in negative contour.

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Contour Drawing, Continued

Inversion contour

Inversion contour drawing is a contour drawing drawn upside down, bottom up, or right to left. The point of drawing in this way is to remove the familiarity of the object. This technique forces you to carefully examine the object from an unfamiliar perspective.

Figure 3-6 is a telephone in inverted contour.

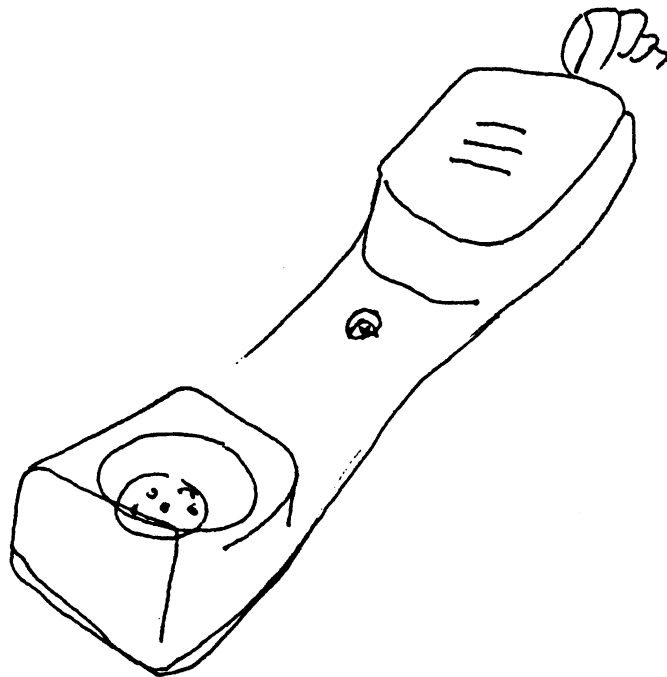


Figure 3-6.—A telephone drawn in inverted contour.

Gesture Drawing

Introduction

In addition to an outline, objects have perceived mass and weight. Correctly portraying mass gives drawings a three-dimensional feel.

Gesture drawing

Gesture drawing is an important technique for developing the ability to draw figures. Gesture drawings are rapidly executed drawings of mass and weight that do not involve outlines or details. To draw in gesture, look only at the object, not at the paper. As you move your eyes over the object, continuously and rapidly move your crayon over the paper. Linger over the areas with weight or mass. You may draw using short abbreviated strokes or you use a continuous stroke never removing the crayon from the paper. Sparsely draw those areas on the object with little weight or mass. Initially, your drawings may appear childlike. After extended practice in gesture drawing, you should perceive weight and mass realistically and with correct proportion.

Figure 3-7 shows examples of practice gesture drawings.



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Figure 3-7.—Gesture drawing.

Basic Shapes

Introduction All forms, regardless of complexity, have, as their basis, one or a combination of basic shapes. Although an object may not perfectly duplicate a basic shape, the shapes are present. Objects are three dimensional in structure. The three dimensions are height, width, and depth.

Basic shapes The four basic shapes are the cube, the sphere, the cylinder, and the cone. Describing objects by using basic forms simplifies the process of drawing and laying out forms on a page. Draw basic shapes as if they were made of glass to see both the inside and outside of the objects. This technique is called *drawing through* an object and enables you to give objects depth as well as height and width.

Figure 3-8 shows the four basic shapes in drawing.

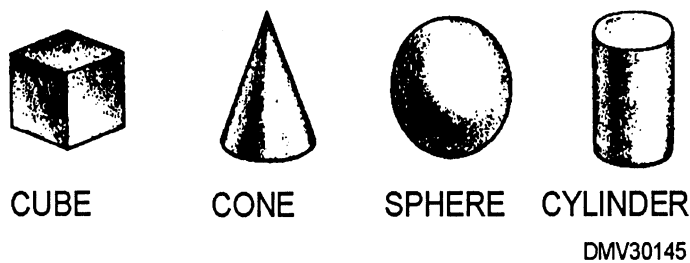


Figure 3-8.—The four basic shapes.

Figure 3-9 shows basic shapes drawn as if they were made of glass.

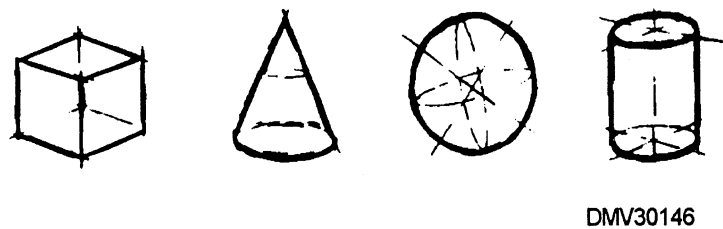


Figure 3-9.—Drawing through basic shapes as if they were made of glass.

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Basic Shapes, Continued

Cubes

Cubes are squares with equal height, width, and depth dimensions. Perspective or viewpoint alters the perceived dimensions of the cube. Varying the dimensions of the cube creates rectangles. Shading and texture modify the basic shape of the cube and more clearly defines objects.

Figure 3-10 shows the dimensions of a cube.

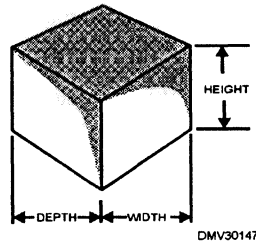


Figure 3-10.—A cube.

Figure 3-11 shows a modified basic cube shape with shading and texture.

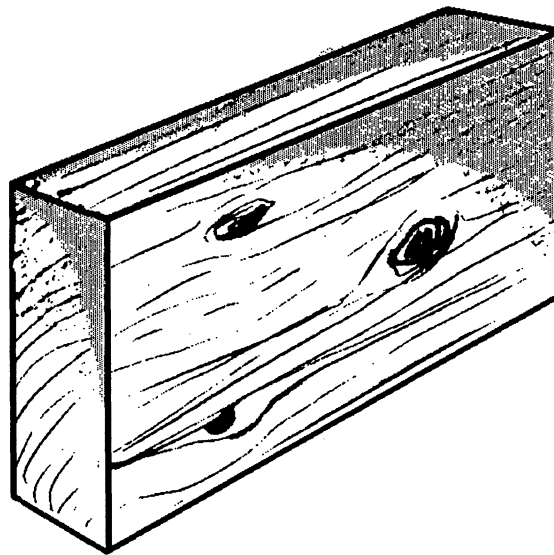


Figure 3-11.—A modified cube with shading and texture.

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Basic Shapes, Continued

Spheres

Spheres are round. The distance from the center of the sphere to any edge of the sphere is known as the *radius*. The radii of spheres extend equally in all directions from the center. A sphere appears round regardless of viewpoint or perspective. Shading on spheres is soft and gradual with no abrupt planes creating sharp contrasts. Changing the length of the radii creates ellipses. Use ellipses to define the depth of spheres.

Figure 3-12 shows the dimensions of a sphere.

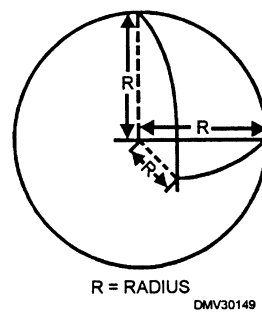


Figure 3-12.—Radii.

Figure 3-13 shows how ellipses define the depth of a sphere.

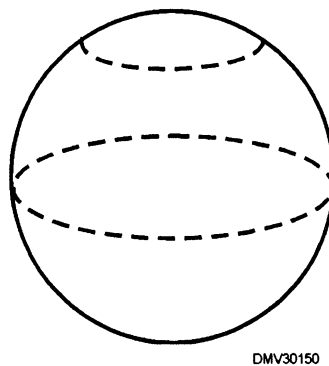


Figure 3-13.—Ellipses define the depth of a sphere.

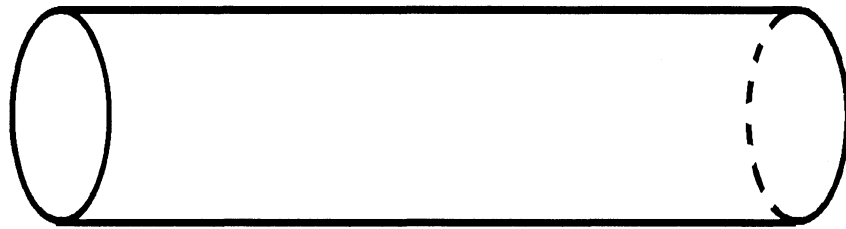
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Basic Shapes, Continued

Cylinders

Cylinders appear as tubes. Construct cylinders by drawing two parallel lines. Define the width of the cylinder with ellipses. Use shading to accentuate the roundness of the tube.

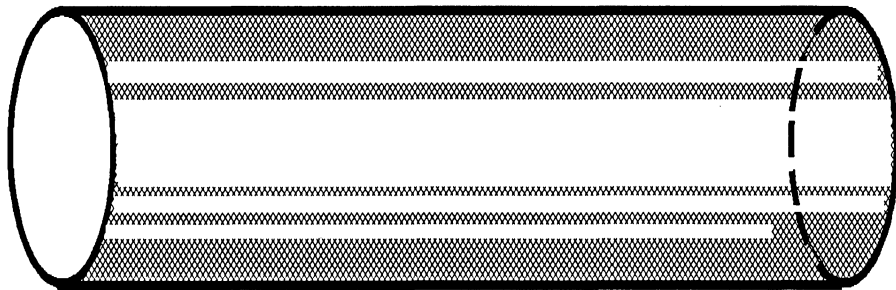
Figure 3-14 shows a cylindrical form.



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Figure 3-14.—A cylindrical form.

Figure 3-15 shows a cylinder with shading added.



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Figure 3-15.—A shaded cylinder.

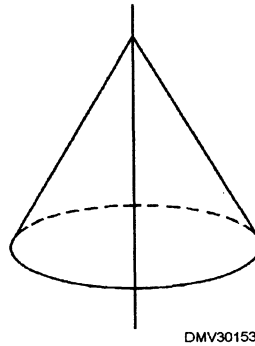
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Basic Shapes, Continued

Cones

Cones appear triangular in shape but, have a circle or ellipse as a base. Lines converging to some point above or below the base determines the height of a cone. Shading defines the roundness of cones.

Figure 3-16 shows a basic cone.



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Figure 3-16.—A cone.

Figure 3-17 shows how shading changes the cone into a tree.

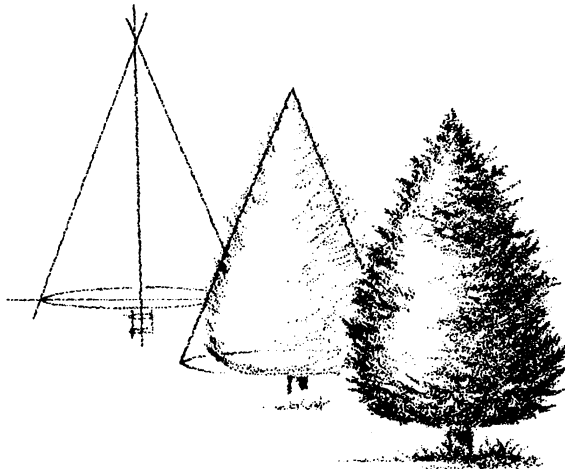


Figure 3-17.—Changing the conical form to trees.

Combining Forms

Introduction

Regardless of how complicated objects seem, you can reduce them to a combination of the four basic forms. Train yourself to see all objects in their basic forms. Practice combining basic forms to create complex objects.

Combining forms

Basic forms combine to create complex objects. For example, a close look at a foot reveals a series of cylinders (toes), a wedge or modified cube (forefoot), and a sphere (heel). By drawing basic forms proportionally, you can draw a human foot.

Figure 3-18 shows a foot reduced to basic forms.

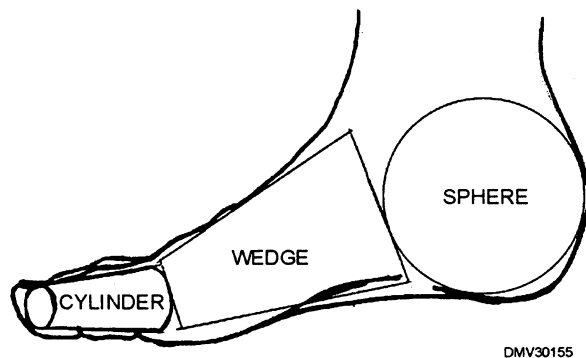


Figure 3-18.—A human foot reduced to basic forms.

Thumbnails

Before drawing, imagine the best descriptive view for your illustration. Draw several small sketches or thumbnails to determine the best view. Draw general shapes or masses without details. Establish correct proportions for larger objects first, then proportion smaller objects. When you have a very rough outline of the best possible view, you are ready to enlarge the sketch and begin drawing.

Enlarging the sketch

Once you select the best view of the object, transfer the mass and proportions to paper for the finished drawing. Indicate areas of mass without detail. Make sure proportions are correct. Keep the drawing clean and free of unnecessary lines.

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Combining Forms, Continued

Drawing forms Examine the object for basic forms. Sketch the basic forms on the drawing. Forms may overlap, invert, or have slight variations. Draw only forms.

Figure 3-19 shows basic forms used to draw a cannon.

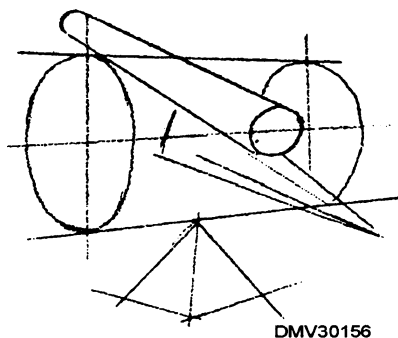


Figure 3-19.—Basic forms drawn in perspective.

Figure 3-20 shows additional basic forms (spheres) drawn proportionately to the first set of cubes to imply cannonballs.

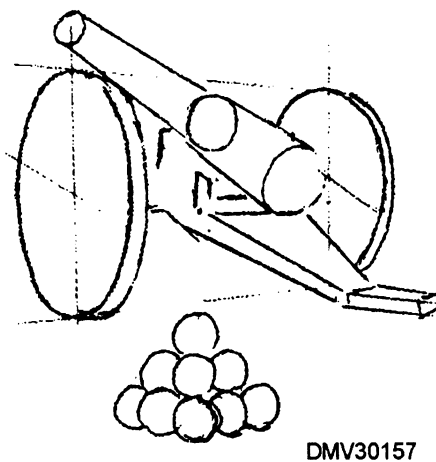


Figure 3-20.—Additional basic forms define the first set of cubes.

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Combining Forms, Continued

Shading

Add shading to drawings after all objects are reduced to basic forms. The most natural light comes from above and to one side of an object. Light from one source is easier to draw than light from multiple sources. Make sure shading results from the same source or sources of illumination for all objects in the drawing.

Details

Add details to drawings only after completing the shading. Details in the foreground of illustrations appear clearly. To add realism to the illustration, blur details as they recede into the background.

Figure 3-21 shows shading and details added to the basic form of the cannon.

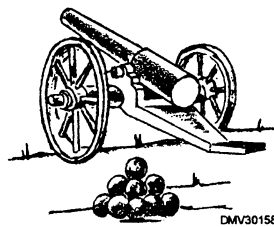


Figure 3-21.—Shade and detail added to a composite of basic forms.

Figure 3-22 illustrates the illusion of depth created by blurring details in the background.

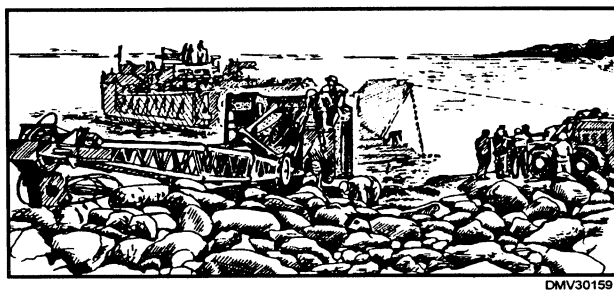


Figure 3-22.—Blurred background detail gives the illusion of depth in illustrations.

Basic Rendering Techniques

Introduction

Correct shape and proportion is only half the number of steps necessary to create effective drawings. How you render viewpoint, arrangement, and the effects of light determines the success of your illustrations.

Viewpoint

Viewing objects from different positions changes the appearance of objects. With the exception of the sphere, forms always change as the angle of view changes. Avoid viewpoints that obscure objects beyond recognition. Limit your use of viewpoints that leave the viewer off balance or disoriented unless this is your intent.

Figure 3-23 shows the normal view of an object together with an unusual viewpoint of the same object.

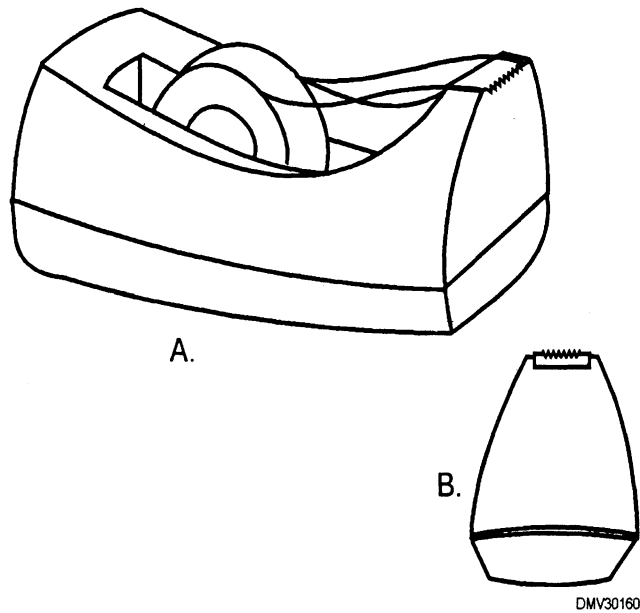


Figure 3-23.—A tape dispenser drawn using a normal viewpoint (View A) and an unusual viewpoint (View B).

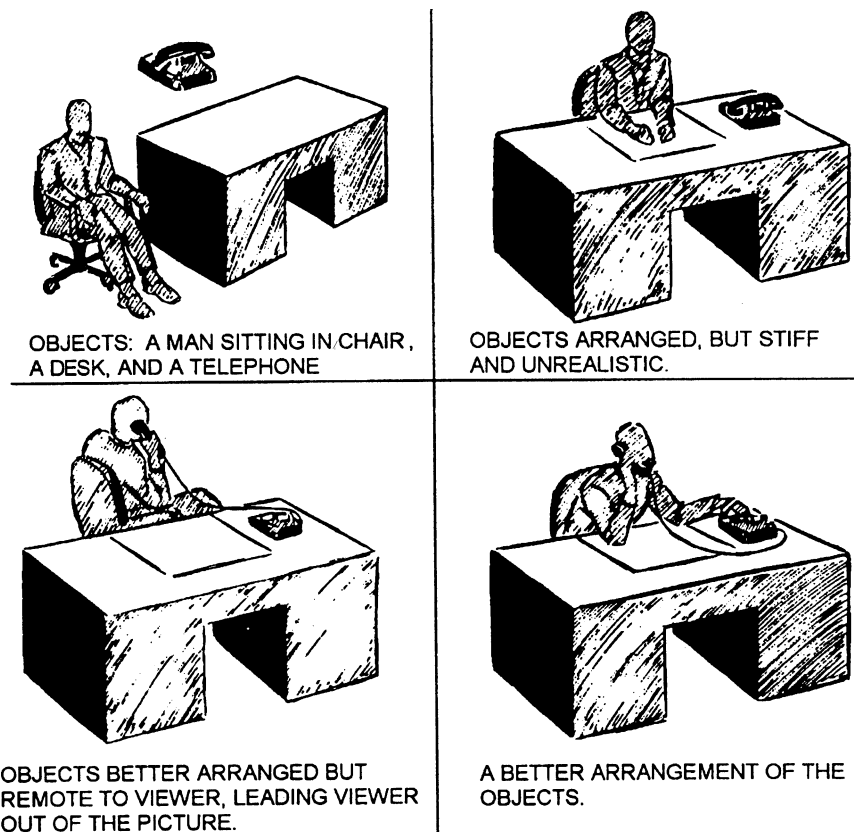
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Basic Rendering Techniques, Continued

Arrangement

A good foundation in perspective drawing is necessary to draw convincing illustrations. Each form occupies space and space surrounds each form. Drawing through objects helps to place them correctly in relation to the other forms in the drawing. Thumbnail sketches allow you to manipulate objects in illustrations before committing yourself to a finished drawing.

Figure 3-24 shows how some arrangements of objects make illustrations effective while other arrangements of the same objects make them ineffective.



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Figure 3-24.—Effective and ineffective arrangements of objects.

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Basic Rendering Techniques, Continued

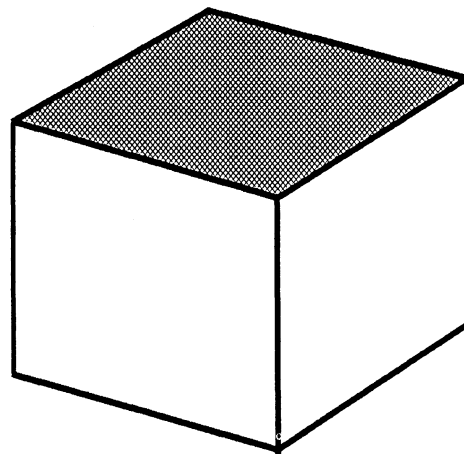
Light

Light, shade, and shadow make drawings more realistic. But shading, no matter how well done, will not improve poorly constructed forms. Light, shade, and shadow are affected by two types of light: artificial and natural (outdoor) light. You can control artificial light, but not natural light. The edges of light and dark areas follow the contour of surfaces or planes of objects. If light emanates from more than one source, make sure the highlights and shadows are consistent for each object in the drawing.

Tone

Tone is the natural color of an object as compared to its surroundings. Tone separates objects from items around it. If you draw an object using only its local tone, the drawing would appear flat and without form. Consider how light or dark the color of an object is in relation to the colors of things nearby. Evaluate the tone of an object based on one of these four tone patterns: light against dark, dark against light, halftone and dark against light, and light and dark against halftone. Separate tones of objects into tonal values.

Figure 3-25 shows a cube in local tone.



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Figure 3-25.—A cube in local tone.

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Basic Rendering Techniques, Continued

Value

Value is the lightness or darkness of tone illuminated by light. Value emphasizes the form of an object. As light strikes an object, areas of light, shade, and shadow appear. Areas struck directly by light may lose local color entirely. Those areas are called highlights. Areas that receive no direct light and appear close to the local color are called halftones. Areas in the shadows or that have a shadow cast over them are darker than the local tone.

Figure 3-26 shows a cube with tonal values.

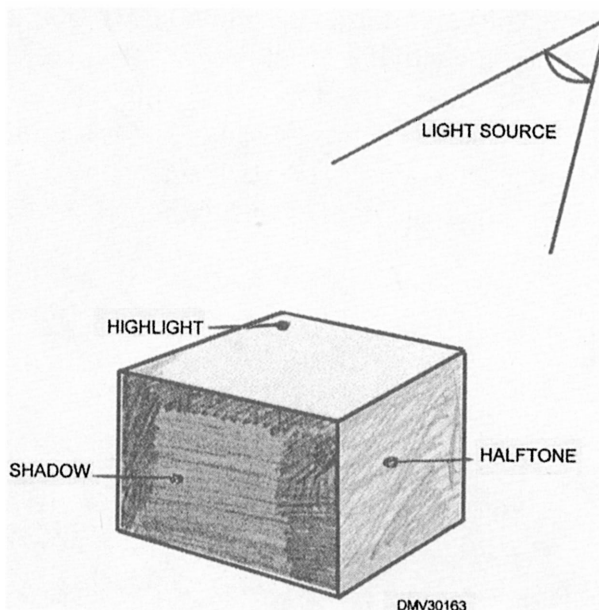


Figure 3-26.—Tonal values of a cube.

Using light, tone, and value

You can use light, tone, and value instead of lines for defining shapes or objects. Select a set or scale of values in the medium of your choice. Compare this scale of values to the natural values of the object. It is sometimes helpful to view the object through partly closed eyes to eliminate detail. Separation between value areas will depend upon the intensity of the light source. Bright light produces well-defined value separations, soft light has the opposite effect. Angular or planed edges have sharply defined value areas. Rounded areas are softly defined and gradual. Hard surfaces have values separated to the extreme while textured areas appear grainy.

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Basic Rendering Techniques, Continued

Reflection

Light from surrounding surfaces reflects back onto an object. Therefore, reflected light modifies shadow areas. Shiny or polished surfaces, such as water, desk tops, floors, and metal objects act like mirrors and catch images of their surroundings. Indicate the most prominent features in the reflection without too much confusing detail. Often reflections are distorted depending on the surface texture of the reflecting surface.

Figure 3-27 shows water reflecting the buildings on the shoreline above it.

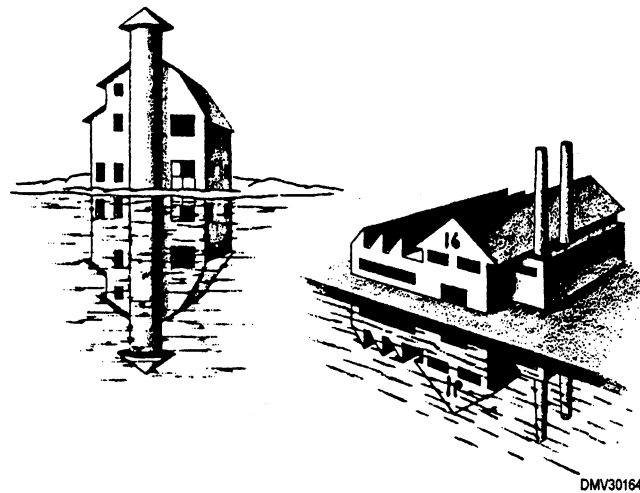


Figure 3-27.—Reflections of buildings off water.

Light source

The direction light comes from alters the appearance of objects. Arrange a light source to come from the direction that best emphasizes the form. Light falling diagonally on subjects from above and to one side of the picture area is the most natural form of illumination. Shadows cast from this position create the greatest apparent depth and roundness. A lower angle of light casts longer shadows. Side lighting is effective for showing texture. To eliminate confusing edges and shadows, use a single light source rather than several.

Figure Drawing

Introduction

One of the most difficult skills to learn is drawing figures. The principal reason beginners have trouble drawing the human figure is that they want to immediately start drawing fully clothed subjects in completed poses. Objectively reducing the human figure to basic shapes with mass and weight greatly simplifies the task of drawing people.

Approaching figure drawing

There are three ways to develop a solid foundation in figure drawing. No one approach provides sufficient perceptual development to draw figures realistically. The three approaches to figure drawing are gesture drawing, reduction to basic forms, and composite drawing.

Gesture drawing the human form

Gesture drawing captures the characteristics of the shapes you draw. Gesture drawings imply characteristics such as overall mood, weight, and physical structure. Imagine how the object or figure feels all the way around. Feel how heavy or light the figure appears. Developing your ability to draw in gesture is a necessary step in developing the perceptual skills necessary to render human form.

Figure 3-28 shows how gesture drawing implies exaltation or dejection.



Figure 3-28.—Gesture drawing implying exaltation and dejection.

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Figure Drawing, Continued

Reducing the figure to basic forms

If you find drawing the human figure intimidating, examine the figure in terms of basic forms. The human figure is a combination of basic forms. Reducing the figure to a series of cubes, spheres, cones, or cylinders simplifies the task of rendering figures by breaking the task into manageable segments.

Figure 3-29 shows how to reduce the human figure to basic forms.

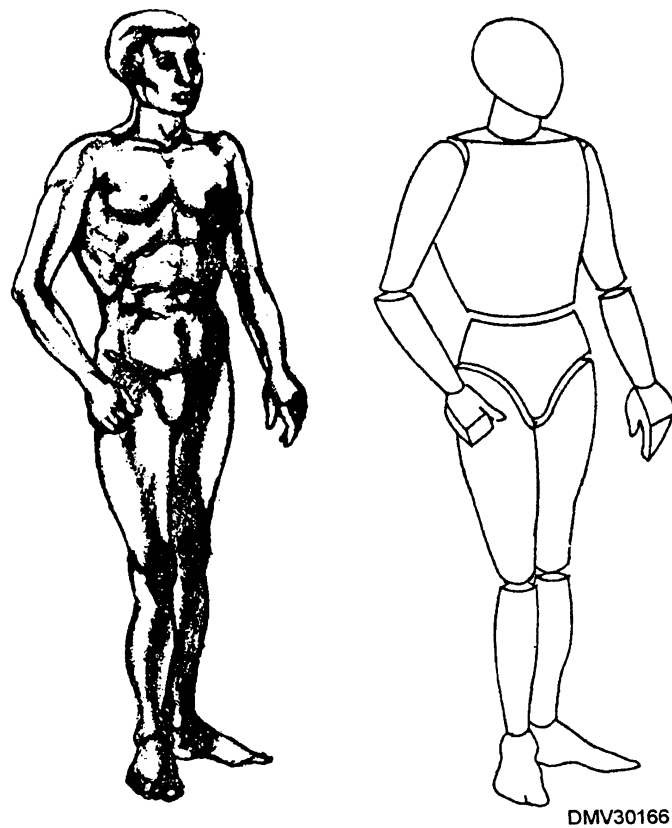


Figure 3-29.—The human form reduced to basic shapes.

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Figure Drawing, Continued

Combining the techniques of gesture drawing and reducing the figure into basic forms

A combination of gesture drawing and basic forms works well to help you understand figure dynamics. Try combining gesture drawing and basic forms construction. Draw a figure in gesture. Do not attempt any detail and strive only for the weight and body dynamics. After the gesture drawing, draw basic forms lightly over the masses. Modify and refine the basic forms to more closely resemble human features.

Figure 3-30 illustrates the technique for combining gesture drawing with basic forms to create a human figure.

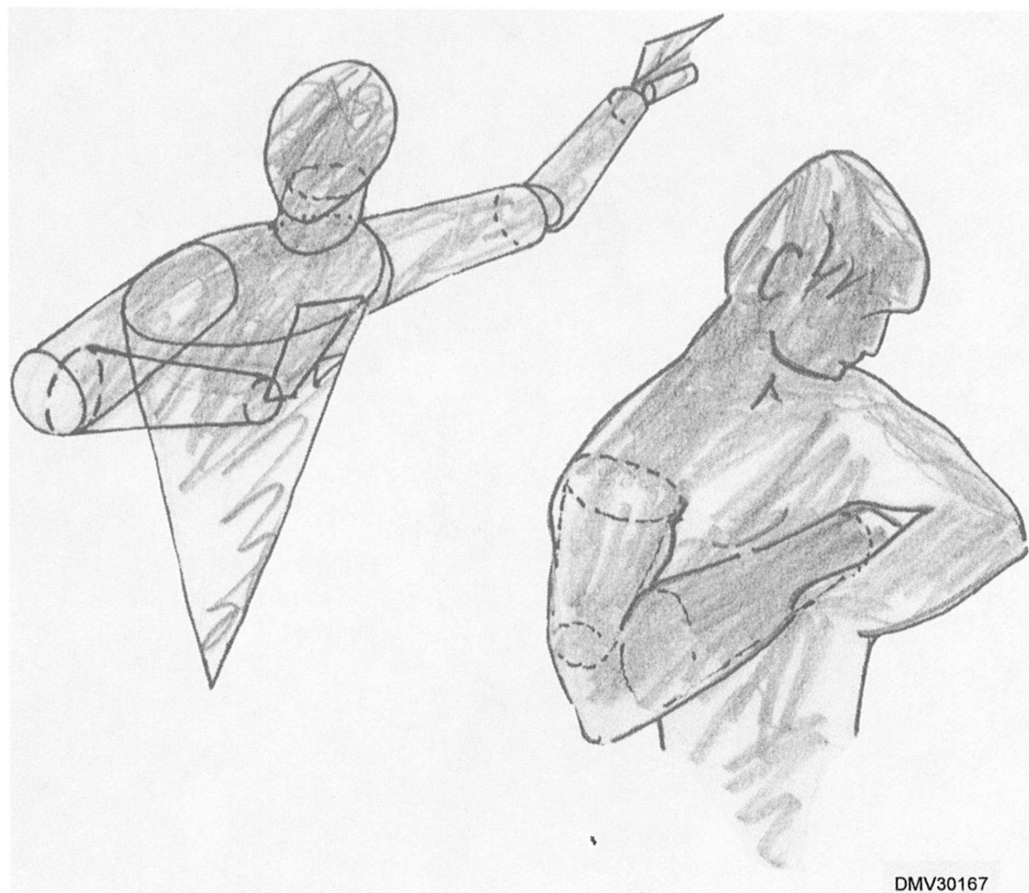


Figure 3-30.—Combining gesture drawing with basic forms to create human figures.

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Figure Drawing, Continued

Composite drawings of the figure

Composite figure drawing is beneficial when drawing dynamic figures (figures in extreme action positions), figures under stress or strain, and well-developed realistic figures. A composite drawing is drawing in layers. Starting with the bone structure, add musculature, and finally, add skin covering. Drawing the figure through composite drawing develops an understanding of the distinct effect on the outward appearance of mass, structure, and carriage. The base drawing is bone structure. You can draw the next layer directly over the bone drawing or place an overlay (in registration) over the base drawing to draw musculature. The final drawing is a contour or outline of the skin surface as it covers the mass of bone and muscle.

Figure 3-31 illustrates the steps of drawing a composite figure.

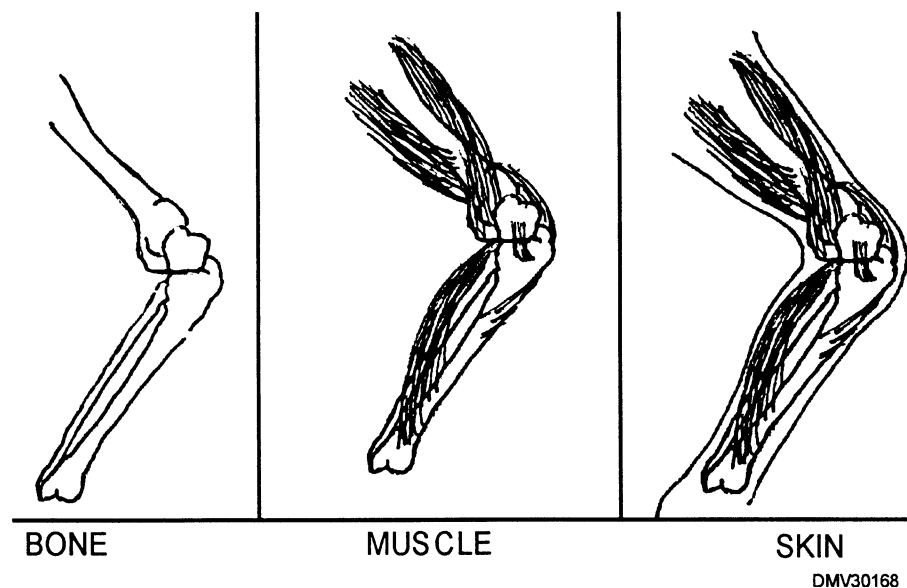


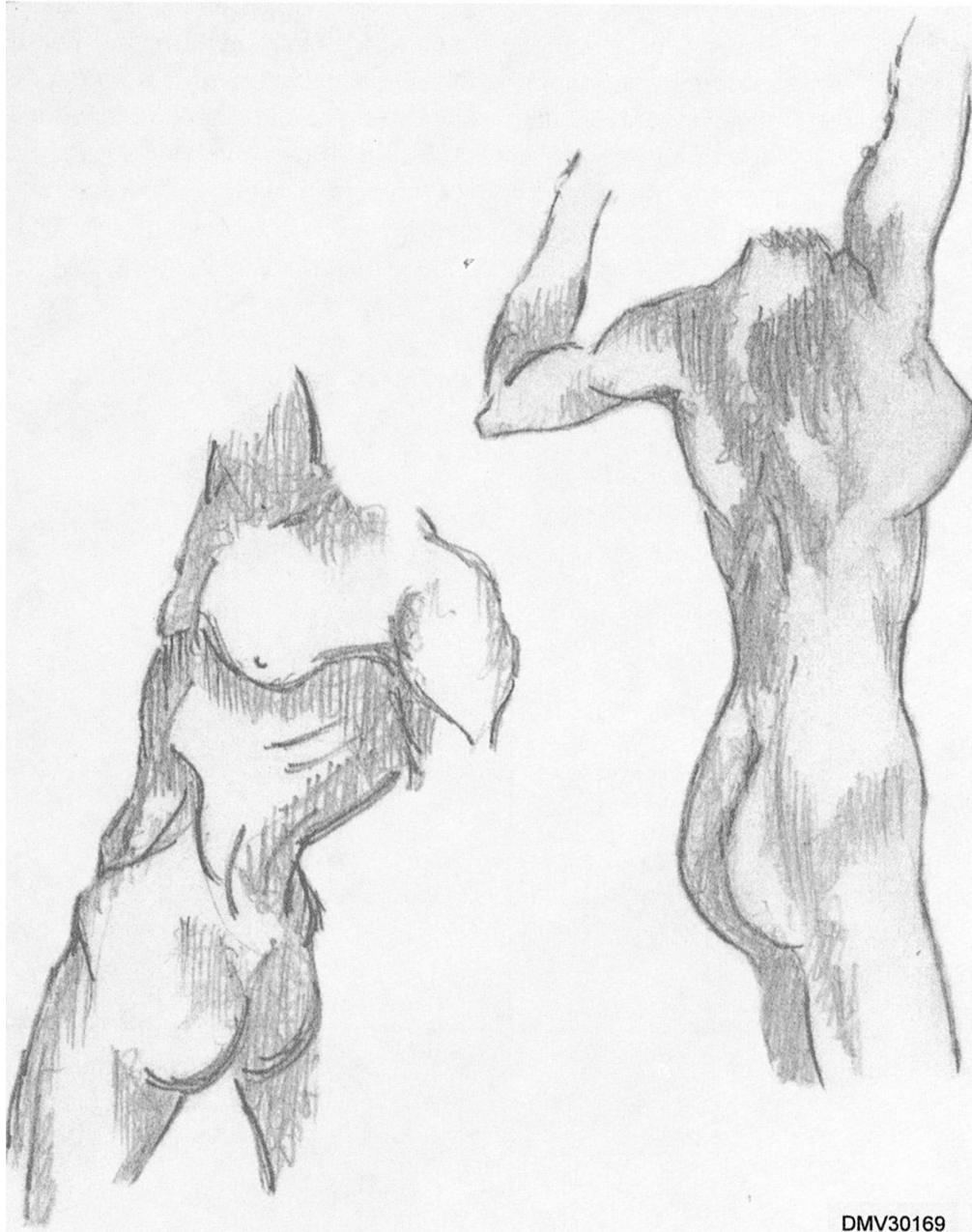
Figure 3-31.—Composite drawing.

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Figure Drawing, Continued

Composite
drawings of the
figure
(Continued)

Figure 3-32 are examples of dynamic figure drawing.



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Figure 3-32.—Dynamic figure drawing.

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Figure Drawing, Continued

Composite drawings of the figure (Continued)

When drawing composite drawings of male and female figures, notice that the bones of the female figure are smaller and smoother. Her pelvis is wider than her rib cage. The female figure has a shorter, straighter collarbone resulting in narrow, sloping shoulders and a long neck. The male figure has a larger skull and an overall larger bone structure than the female. The male breastbone is longer and his pelvis is narrow, deep and approximately the same width as his rib cage. The rib cage of the male figure is short as is the distance between the rib cage and pelvis as a result, the male torso appears shorter than that of a female.

Figure 3-33 identifies the bone structure of male and female figures and shows the relative difference in size.

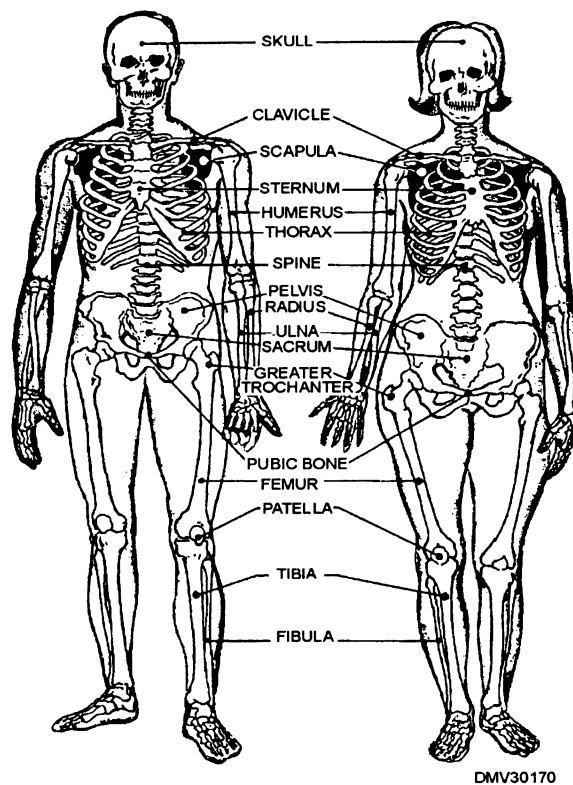


Figure 3-33.—Differences in bone structure for male and female forms.

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Figure Drawing, Continued

Common errors The beginning draftsman initially tries to draw figures with too much detail. Until you develop your ability to draw figures well, you shouldn't sabotage your efforts by overcomplicating the task. Draw figures without clothes and without details.

Figure proportions Another difficult aspect of figure drawing is understanding proportion. Figure proportion refers to the relative length of the arms, legs, torso, and head. To simplify figure proportion, use the head as a standard unit of measure. The distance from the chin to the top of the skull is used for vertical measurements and the distance from ear to ear is used for horizontal measurements. The head unit cannot be specified in inches; measure each figure in terms of its own head size.

Measuring adult figure height with the head The average adult human figure is 7 ½ heads high. But, most people's legs are short compared to the rest of their body and drawing them this height makes them appear stout. Round the average adult human figure to 8 heads in height. Although the male is usually taller than the female, use 8 head units for both. Remember, you measure each figure by its own head size.

To apportion the 8 head unit height for the adult figure, use this table:

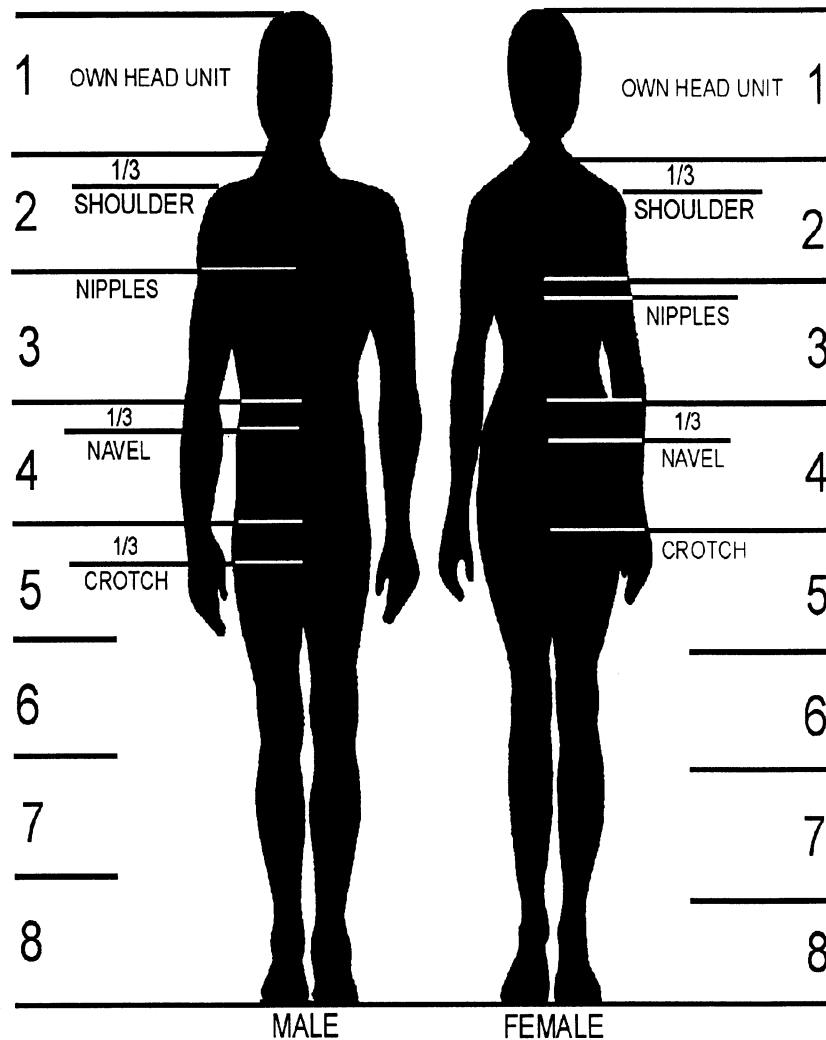
Segment	Size
Head	1 head high
Neck	1/3 head high
Torso (from the bottom of the neck to the crotch)	2 2/3 heads high
Upper leg (crotch to just below the knee)	2 heads high
Lower leg (below the knee to soles of the feet)	2 heads high

Continued on next page

Figure Drawing, Continued

Measuring
adult figure
height with the
head
(Continued)

Figure 3-34 shows the heights in head units of male and female figures.



DMV30171

Figure 3-34.—The heights of male and female forms indicated by units of their own heads.

Continued on next page

Figure Drawing, Continued

Measuring adult figure width with the head

The width of the head from ear to ear is used to proportionally measure the width of the human figure. Male shoulders are a full 3 heads wide and his hips are 2 heads wide. A male figure is generally thick and angular. Female shoulders and hips are nearly equal in proportion. The shoulders of a female figure taper and appear more round.

Figure 3-35 shows the differences in head units in width between a male and female figure.

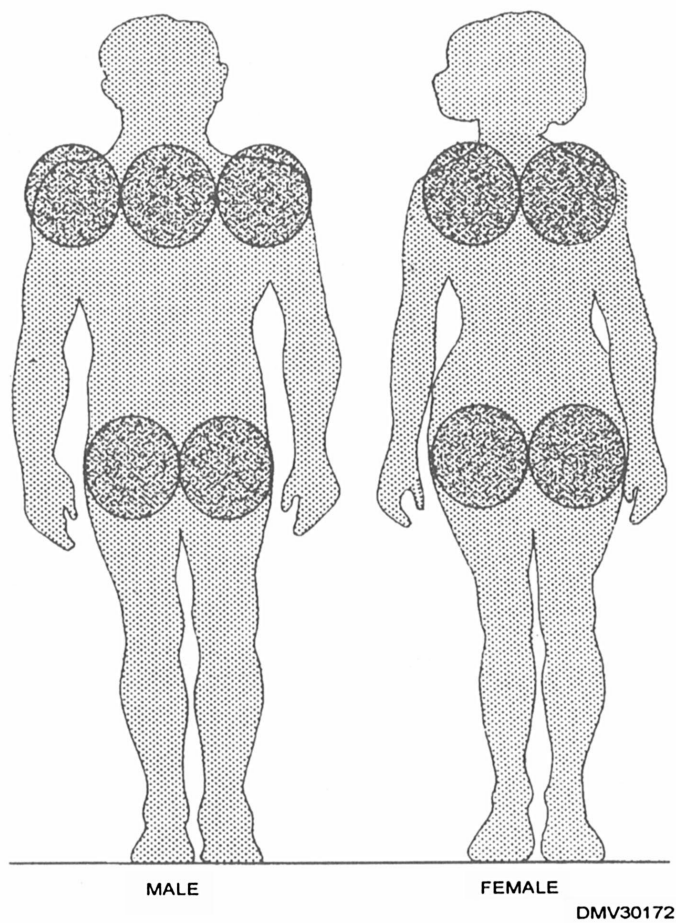


Figure 3-35.—Relationship of the head to head unit of measure to the widths of male and female figures.

Continued on next page

Figure Drawing, Continued

Figure profiles The important thing to note in the profile of male and female figures is that they are not symmetrical. The center of gravity passes through the center of the head, chest, hips, and feet. Most of the neck and lower back fall behind the center of gravity, while the largest part of the midsection is in front of the centerline. The curve of the back has a slight and continuous “S” shape. In profile, female figures appear narrower than male figures. Female figures also have less developed muscles, smaller arms, wrists, ankles, and feet. The breast and crotch of male figures are slightly higher and the waistline slightly lower than female figures.

Figure 3-36 shows differences in the profiles of male and female figures.

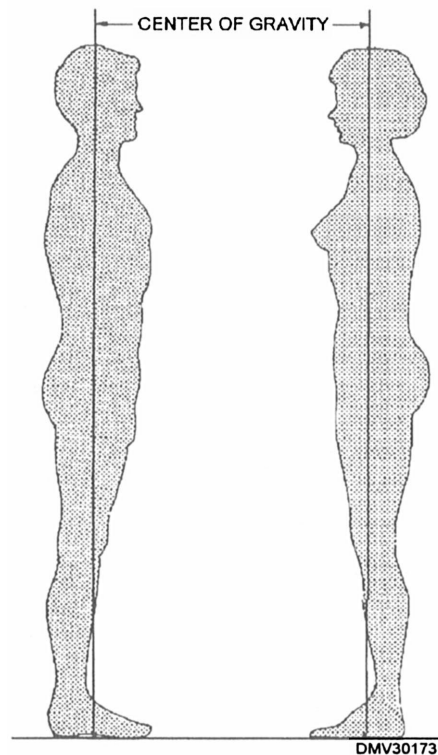


Figure 3-36.—Profile differences in male and female figures.

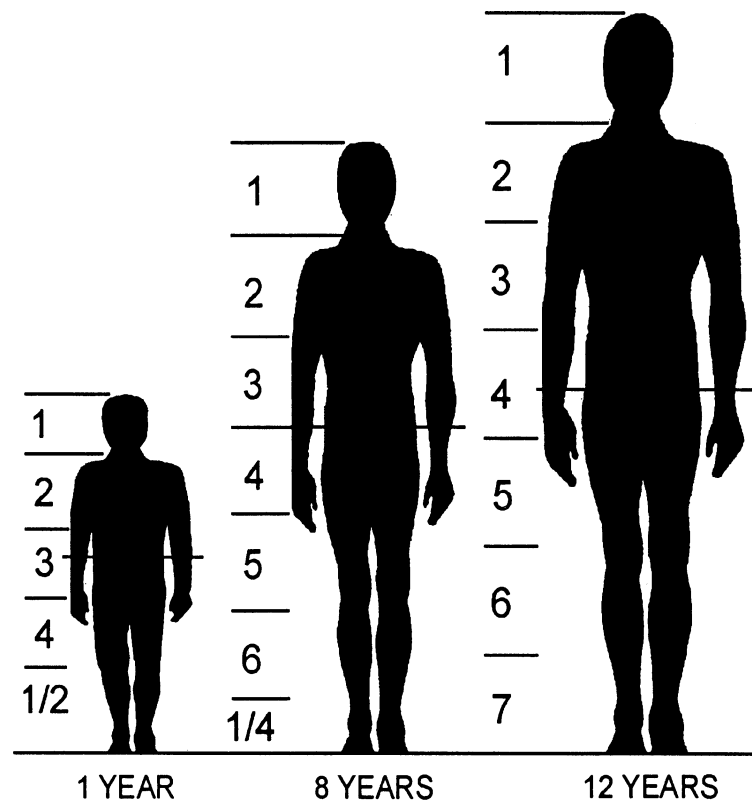
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Figure Drawing, Continued

Measuring the child figure with the head

The proportions of the human figure change at various ages. At birth, a baby's head is large compared to the rest of its body. At the age of 1 year, the overall height of the body is $4\frac{1}{2}$ head units. The neck to the feet measures $3\frac{1}{2}$ heads. By the age of 8, the average overall height is $6\frac{1}{4}$ heads. The center of the body is just above the hips and the arms and legs are longer than at the age of 1 year. At the age of 12, the overall figure is 7 head units high and the center of the body is now the crotch. From this age on, the body broadens, becomes slightly taller, and assumes the characteristics of the typical male or female form.

Figure 3-37 shows the proportional changes in height of a child at various ages.



DMV30174

Figure 3-37.—The average height of a child at various ages.

Continued on next page

Figure Drawing, Continued

Foreshortening Foreshortening is the visible distortion in width and length of an object when viewed in perspective. An object slanting toward or away from the viewer seems to diminish in size and change shape. Keen observation and practice are keys to determining the amount of foreshortening required to realistically portray figures.

Figure 3-38 shows foreshortened cylinders.

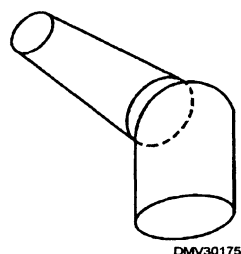


Figure 3-38.

—Foreshortened cylinders.

Figure 3-39 shows a foreshortened arm.

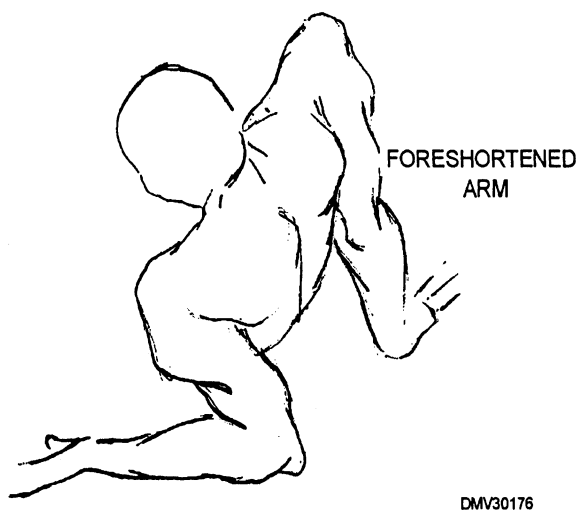


Figure 3-39.—Human figure with foreshortened arm.

Figure Elements

Introduction

For simplicity in constructing the human figure, divide the figure into five elements. Approach each element as a task and reduce each task to basic forms. The five elements in figure construction are the torso, the arms, the legs, the hands and feet, and the head.

Torso

The torso, or upper body, is easily rendered as a modification of two cylinders or an inverted and truncated (cut off at the apex) cone. Two inverted cones may portray some body shapes better. Running along the center of the back, connecting the head to the neck and the neck to portions of the torso, is a flexible column that allows the torso to twist and bend.

Figure 3-40 shows cylinder and cone construction of torsos.

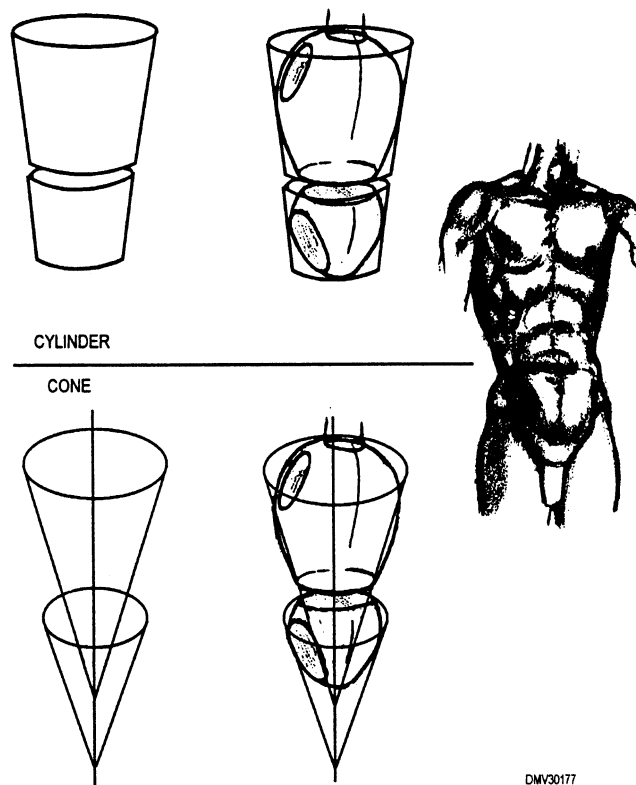


Figure 3-40.—Constructing a torso from cylinders and cones

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Figure Elements, Continued

Arms

The upper and lower arms are modified cylinders of approximately equal length. You may draw these cylinders at great angles in relation to each other because the arms bend and rotate. The arms attach to the torso by a ball-and-socket joint that allows rotation. The cylinders of the arms have a hinge joint that allows the forearm to bend forward.

Figure 3-41 shows the cylinders of the arms in various positions.

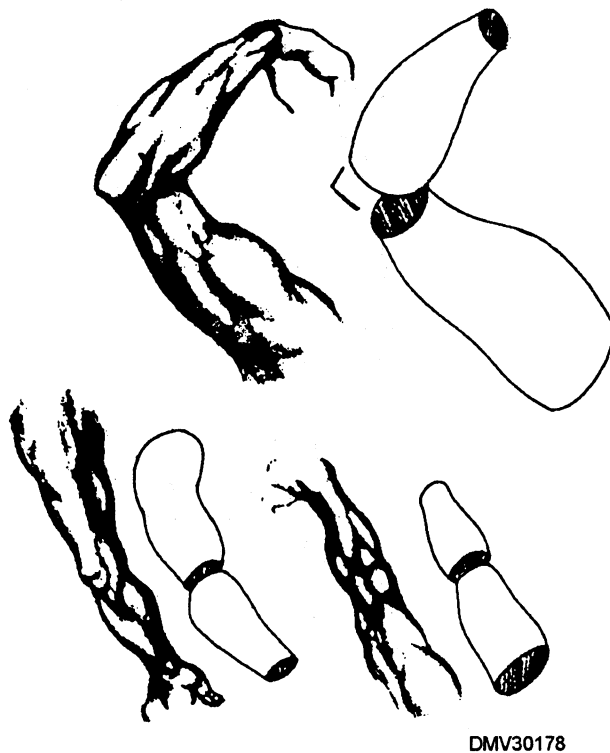


Figure 3-41.—The cylinders of the arm in various positions.

Continued on next page

Figure Elements, Continued

Legs

Legs, like arms, are modified cylinders of approximately equal length. Legs attach to the lower torso with a ball-and-socket joint for rotation. The cylinders of each leg are hinged to permit bending in a direction opposite that of the arms.

Figure 3-42 shows the cylindrical characteristics and hinge joint of the leg.

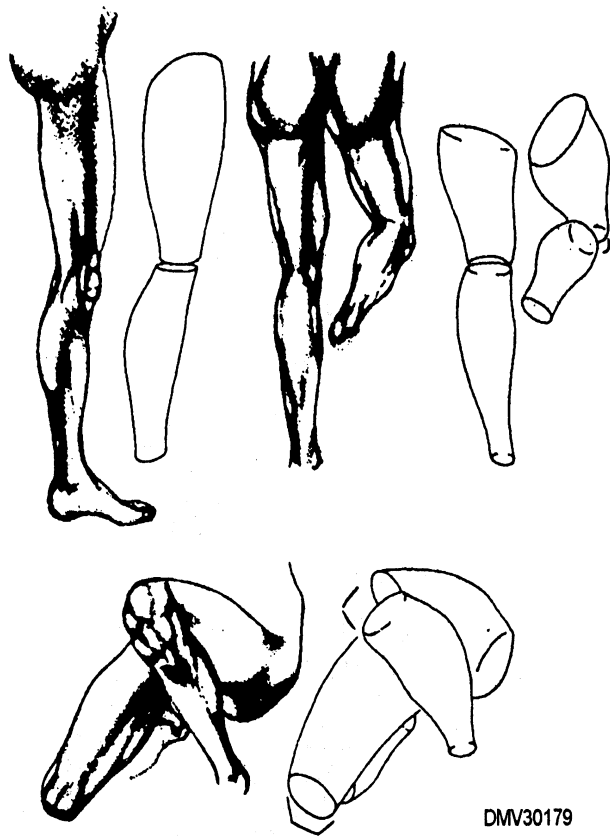


Figure 3-42.—The cylinders and joints of legs.

Continued on next page

Figure Elements, Continued

Hands and feet Hands and feet are each combinations of basic forms. Both the hands and feet attach to the cylinders of the lower arm and leg, respectively, with a compound rotary joint.. This joint allows rotation similar to that of a ball-and-socket joint.

HANDS: A cube and wedge (modified cube) represent the hand. The cube is the palm and the wedge is the mass of fingers. The cube and wedge are approximately equal in size. More detailed representation of the fingers is possible by using cylinders for the fingers.

Figure 3-43 shows a hand represented by a cube and a wedge, and a cube and cylinders.

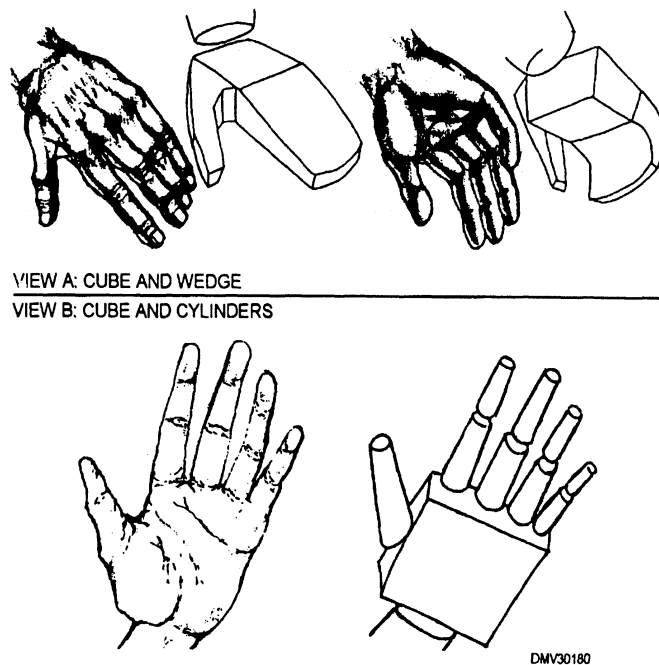


Figure 3-43.—A hand drawn with cubes and wedges (View A) and a cube and cylinders (View B).

Continued on next page

Figure Elements, Continued

Hands and feet (Continued)

FEET: A cone, a wedge, a sphere, and cylinders represent feet. The cone is truncated at the ankle. The sphere is the ball of the foot. A wedge represents the forefoot or arch of the foot and the cylinders are toes.

Figure 3-44 shows how a foot looks represented by basic forms.



VIEW A: COMPLEX FORMS

VIEW B: BASIC FORMS

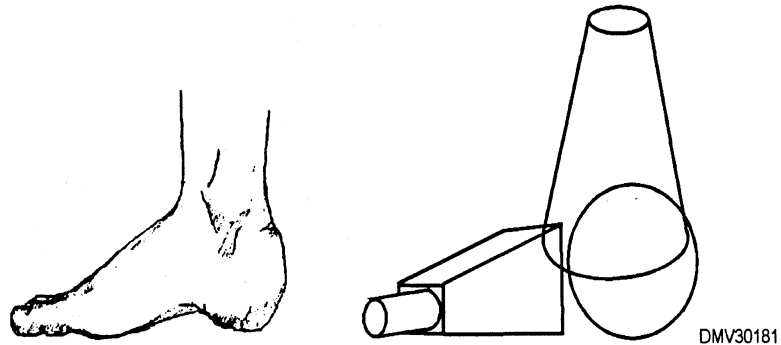


Figure 3-44.—Feet reduced to complex forms (View A) and basic forms (View B).

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Figure Elements, Continued

Head

The basic shape of the human head is a modified sphere, shaped very much like an egg. A short, thick cylinder drawn as wide as the lower portion of the head forms a neck to support the egg-shaped head. The head, the neck, and the torso attach to a flexible column or spine allowing rotation and up-and-down movement.

Figure 3-45 shows how the egg-shaped head appears on the cylindrical neck.

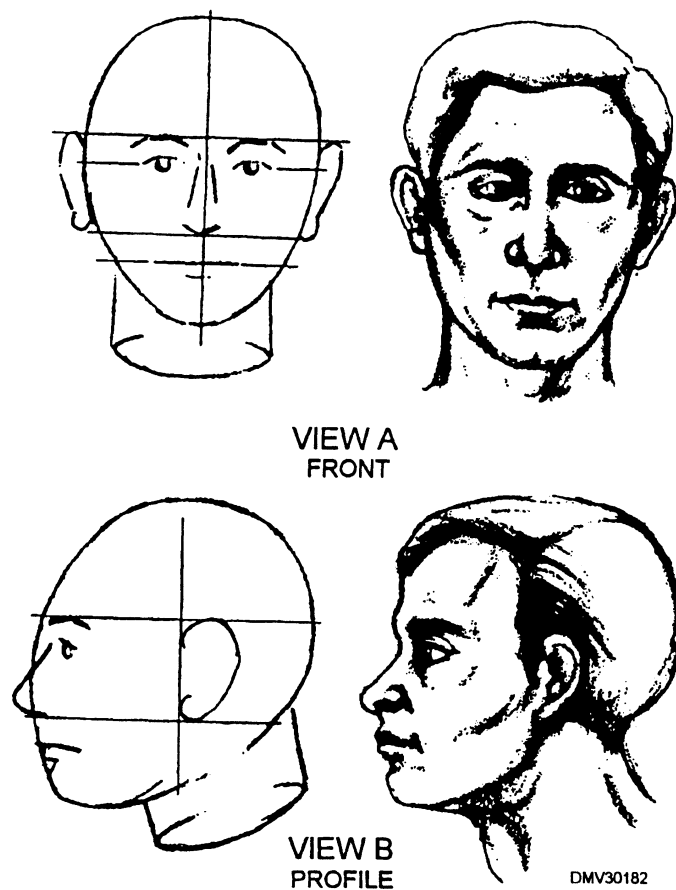


Figure 3-45.—The eggshaped head and cylindrical neck from the front (View A) and the profile view (View B).

Facial Features

Introduction

The features of the head are often the most difficult to realistically portray. There is no substitute for constant practice and careful observation.

Location of the features

Horizontal and vertical lines locate facial features on the head. To place features on a head, draw a vertical centerline and a horizontal centerline on the head. The vertical centerline positions the nose and mouth. The horizontal centerline locates the eyes and the top of the nose. Just above the horizontal centerline, draw a line to locate the eyebrows and the top of the ears. Draw another horizontal line midway between the horizontal centerline and the chin to find the bottom of the nose and ears. Just below this, draw a horizontal line to place the mouth.

Figure 3-46 shows the steps involved in placing facial features.

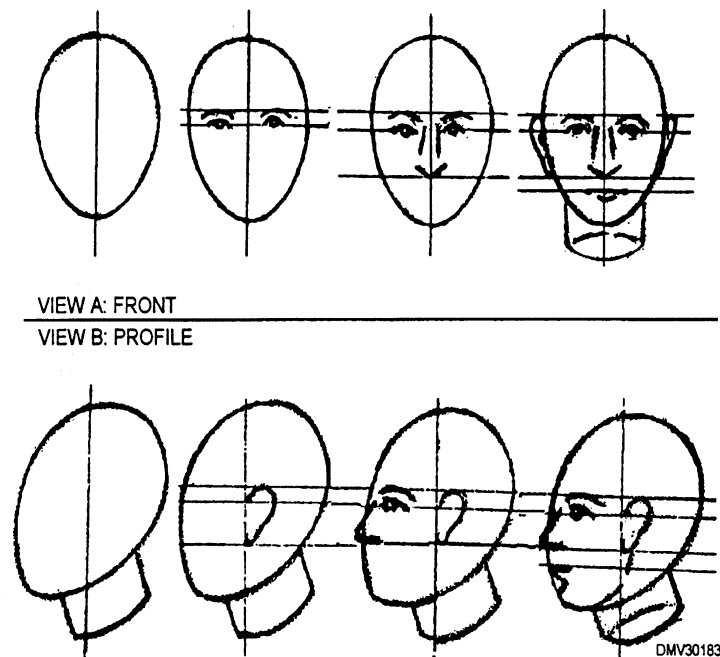


Figure 3-46.—Guidelines for placing facial features on the front (View A) and profile view (View B).

Continued on next page

Facial Features, Continued

Features in profile

Viewing the head in profile further defines facial features. Some features of the head appear to indent or protrude. In a side view, the ears are just back of the vertical centerline, the eyes are slightly indented, the nose projects, and the brow, mouth, and chin protrude from the basic egg-shaped skull. The bases of the nose, cheekbones, earlobes, and skull lie on a line across the head. For correct placement of features in a view of the head from different angles, use the technique of drawing through. As the vertical and horizontal guidelines rotate with the head, draw them as ellipses to retain the correct relationship of the features and the solid roundness of the head.

Figure 3-47 shows the head from different angles and the effect on the facial features.

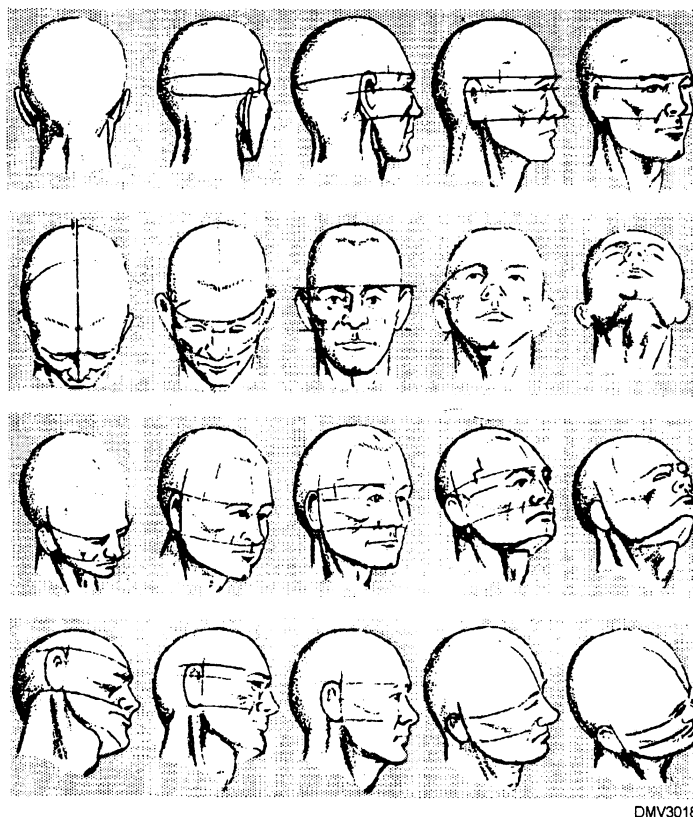


Figure 3-47.—The effect of turning the head to different angles on the placement of facial features.

Continued on next page

Facial Features, Continued

Feature proportions

As with figure proportions, using a standardized unit of measure helps to eliminate distortion. The unit of measure for correctly placing features on a head is the length horizontally across the eye.

To apportion the facial features on the head, use this table:

Feature	Size
Head (at the brow)	4 eye lengths
Eyes	$\frac{1}{2}$ eye length wide, 1 eye length long, 1 eye length apart
Nose	1 eye length, parallel lines drawn down from the inside corners of the eyes locate the nostrils
Mouth	2 eye lengths, comers of the mouth should be directly under the center of the eyes

Figure 3-48 shows important check-points for the placement of facial features.

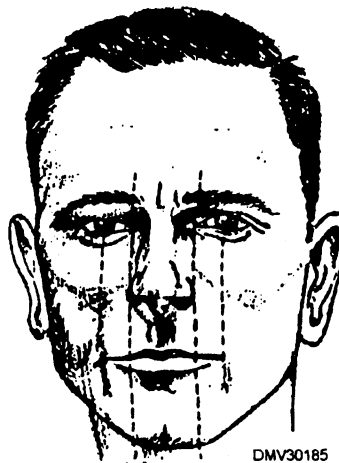


Figure 3-48.—Facial feature checkpoints.

Continued on next page

Facial Features, Continued

Eyes

The eyes are one of the most expressive features of the face. The eyeball itself is round. Two eye lids curve around the eyeball. Both lids have lashes, but are completely different in design at the inner and outer corners. At the outer corner, the upper lid overhangs the lower lid. At the inner corner, the lids do not touch. When the eye is open, a pinkish membrane separates the lids. The eye in profile slants downward and inward from the forehead to the cheekbone. The exposed part of the eye is always moist. The moisture reflects light and causes a distinct highlight. The location of the highlight depends on the direction of the light and is an important factor in making your drawing appear lifelike.

Figure 3-49 shows drawings of eyes.



Figure 3-49.—Drawings of eyes.

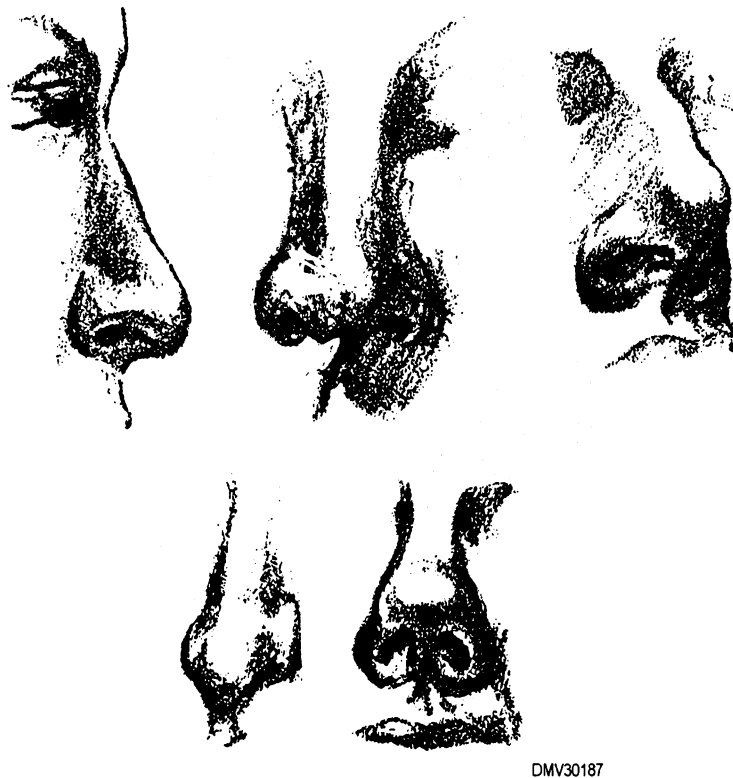
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Facial Features, Continued

Nose

The nose is narrow at the top and wide at the bottom. The upper ridge of the nose is bony. The lower half of the nose consists of five pieces of flexible cartilage responsive to the actions of the facial muscles. The cartilage that forms the hook of the nose is between, and extends slightly below, the nostrils. Nostril cavities are generally triangular shaped and slant outward toward the back of the nose.

Figure 3-50 shows several drawings of different noses.



DMV30187

Figure 3-50.—Several drawings of noses.

Continued on next page

Facial Features, Continued

Mouth and chin The mouth, like the eyes, is very expressive. The upper lip is thickest in the center and thins downward to the corners. The upper lip is flat and angular compared to the lower lip which is more rounded. When the mouth closes, the center section of the upper lip thrusts forward and rests in the center of the lower lip. The lower lip rests under the upper lip. When seen in profile, the lips slope backward from near the top of the nose to the furrow at the top of the chin. A slight depression forms when the corners of the mouth meet the lower cheek. This depression is usually more pronounced in male faces. In a smile or laugh, the corners of the mouth pull back drawing the upper lip taut and curving the lower lip upwards. The upper teeth are normally visible during a smile. Rarely are the lower teeth seen except in extreme actions of the mouth. The chin bulges forward at the center. The shape of the chin usually matches the character of the rest of the face.

Figure 3-51 shows mouth and chin combinations.

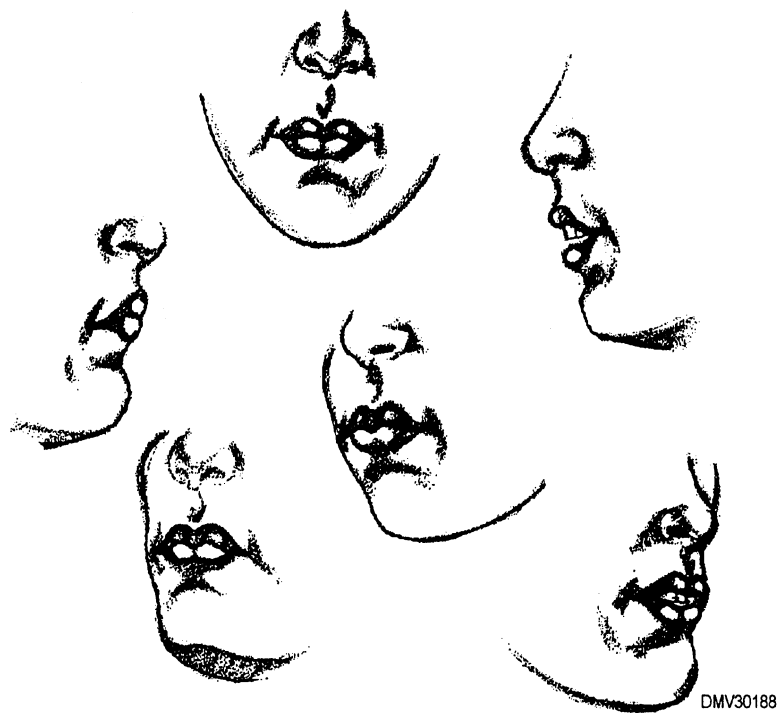


Figure 3-51.—Mouth and chin combinations.

Continued on next page

Facial Features, Continued

Ears

The ears are a mass of soft cartilage and flesh. They are wide at the top and narrow at the bottom, terminating in a fleshy lobe. The middle of the ear is bowl-shaped and surrounded by whorls and curves of flesh-covered cartilage. The four major shapes of the ear are the outer rim, the inner rim, the bowl area, and the lobe.

Figure 3-52 shows the four major shapes of an ear.

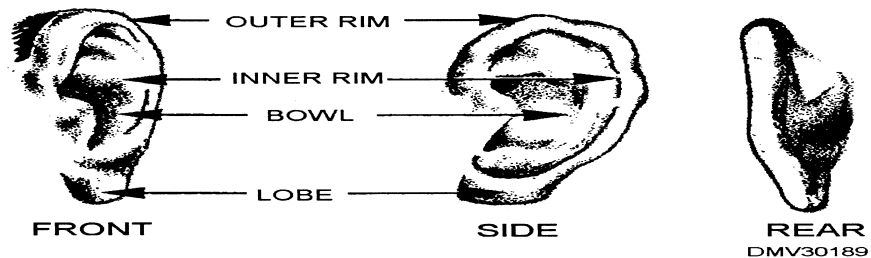


Figure 3-52.—The shape of ears in three perspectives.

Rendering Techniques for Figure Drawing

Introduction

At this point you have drawn a proportional figure that displays height, width, and length. Areas of mass and weight appear in substructure. Portraying the effects of light and shadow, and adding clothing to the figure adds to the realism of the drawing.

Light and shadow

Add light and shadow areas as you would for any of the other basic shapes. Locate the light source and make highlights and cast shadows consistent with it. Remember, the musculature under the skin layers interrupts light and creates shadows of its own. This is particularly true with well-defined musculature and dynamic posturing or figures in extreme actions.

Figure 3-53 shows shadows cast by well-defined musculature.

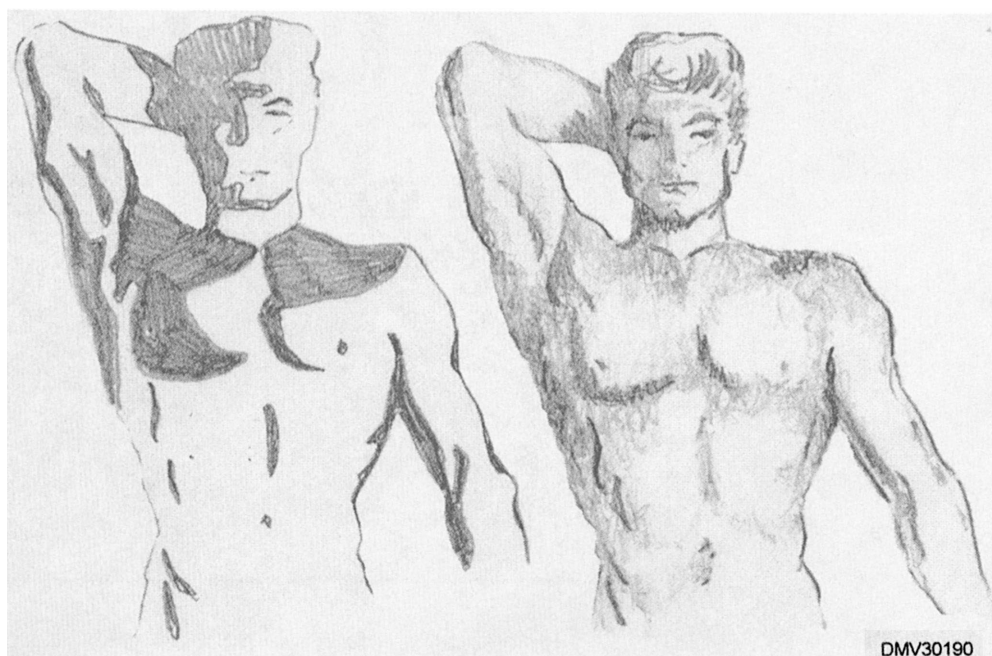


Figure 3-53.—Shadow areas cast by well-defined musculature.

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Rendering Techniques for Figure Drawing, Continued

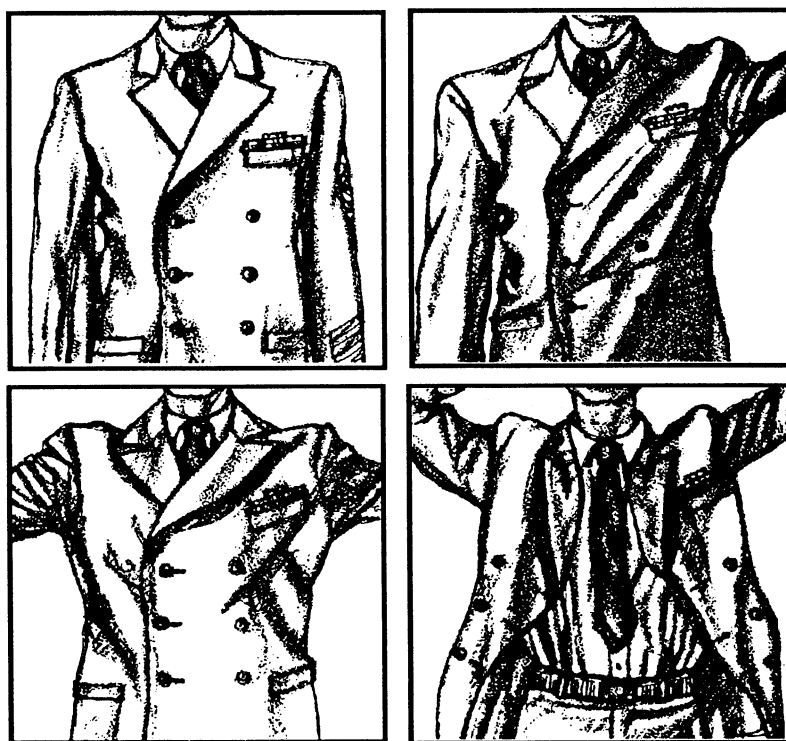
Clothing

How successfully you draw the folds of clothing on a figure has a great deal to do with how realistic your drawings appear. Clothing on a figure does not change in amount but, condenses. Condensed cloth creates folds in different shapes and in different places. The shapes, place, and direction the folds take is determined by gravity, tension, and action.

Gravity folds

Shoulders for the coat, shirt, blouse, and the waist for the skirt and trousers form gravity folds. The coat, supported by the shoulders, hangs free at the waist. The action of the arms, and whether the coat is buttoned or unbuttoned, determine how and where the folds appear.

Figure 3-54 shows the folds of a buttoned and unbuttoned coat.



DMV30191

Figure 3-54.—Four examples of folds in a coat.

Continued on next page

Rendering Techniques, Continued

Gravity folds (Continued)

Shirts and blouses are supported at the shoulders, but are drawn tight at the waist. A variety of folds radiate from the waist to the shoulders. Body posture also effects how folds appear. Shirts and blouses worn by women have additional support from the bust line. Notice that most folds on the sleeves occur on the upper side of the arm at the elbow.

Figure 3-55 shows folds in shirts.

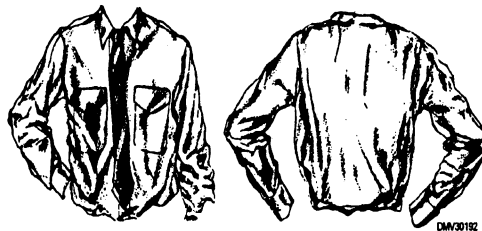


Figure 3-55.—Two perspectives showing folds in shirts.

Figure 3-56 shows the folds in women's blouses.

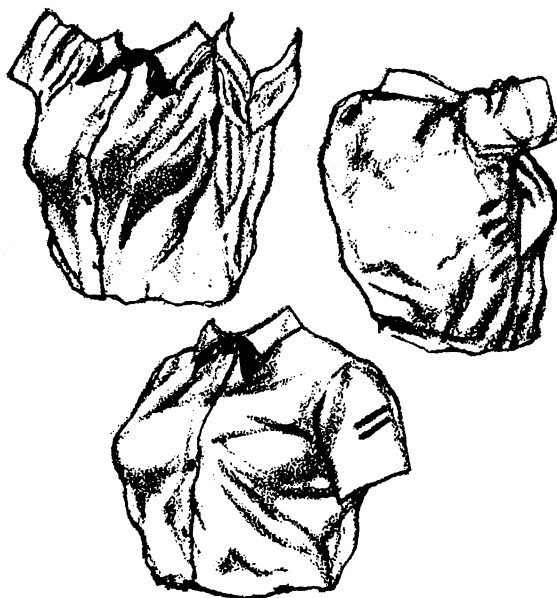


Figure 3-56.—Three perspectives showing folds in blouses.

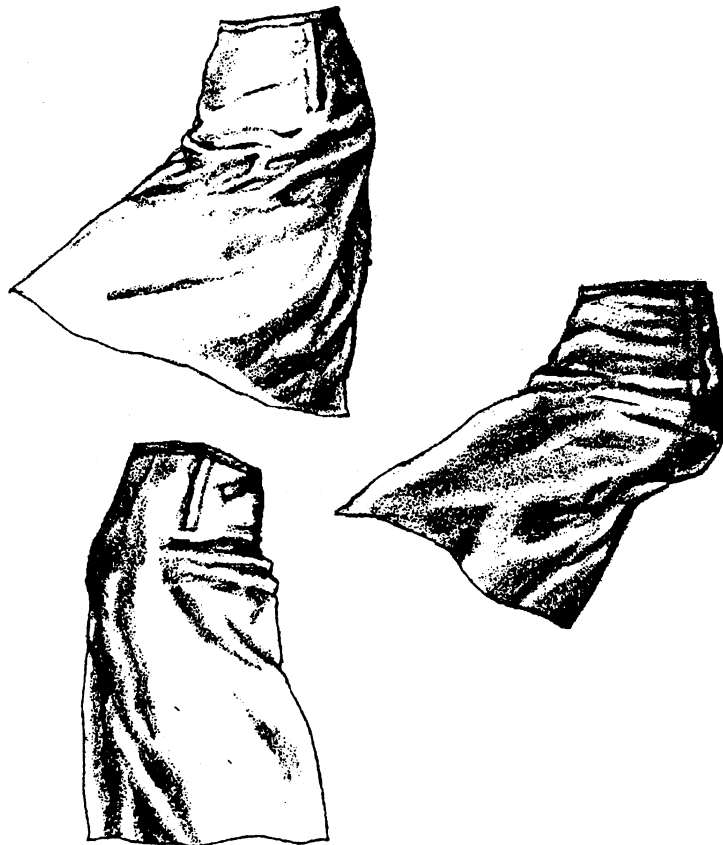
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Rendering Techniques, Continued

Gravity folds (Continued)

The waist and hips support skirts and trousers. The bottom of the skirt hangs free. The design of a woman's skirt is sometimes restrictive and when movement reaches the limits of the material, strong lines of tension appear. Trousers hang free but, because of their closeness to the body, they are greatly affected by tension and action.

Figure 3-57 shows folds in skirts.



DMV30194

Figure 3-57.—Three perspectives showing folds in skirts.

Continued on next page

Rendering Techniques, Continued

Tension folds

Folds formed by tension are at the 'shoulder-arm junction, the elbow, the waist, the leg-torso junction, and the knee. Although trousers are supported at the waist, they display a significant amount of tension folds at the waist, the crotch, and the knee. Notice that some of the folds terminate at the seam of the pantleg which act like a point of support.

Figure 3-58 shows folds in pairs of trousers.

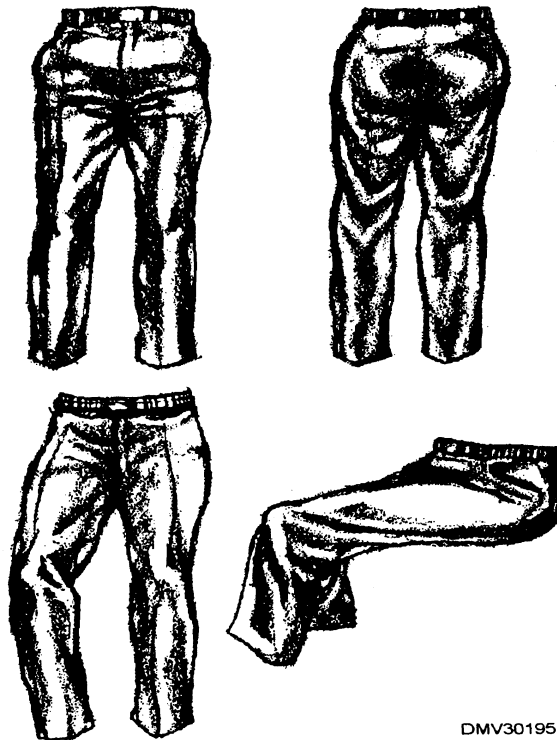


Figure 3-58.—Four perspectives showing folds in trousers.

Action folds

When the arm, the torso, or the leg bends or changes direction, the cloth slackens on the opposite side of the tension. Folds become strongly directional. Buttons may interrupt folds and create folds of their own. As tension or action increases, folds become tighter.

Expression

Introduction

Your drawings communicate by images alone. Use expression and gestures to imply emotions. Specific positions or changes in body posture emote feelings. Use directional lines to imply relationships and increase communications between figure elements.

Posturing

The human figure is constantly changing shape. The carriage or posture the body assumes when it changes, shape implies moods or feelings. Typically, a emaciated figure evokes weariness. A figure drawn with lines that appear uplifting portrays happiness or joy. The mood you attempt to capture in your drawing should be the one that best conveys your idea or emotional message to the intended audience.

Figure 3-59 shows methods of conveying five typical moods.

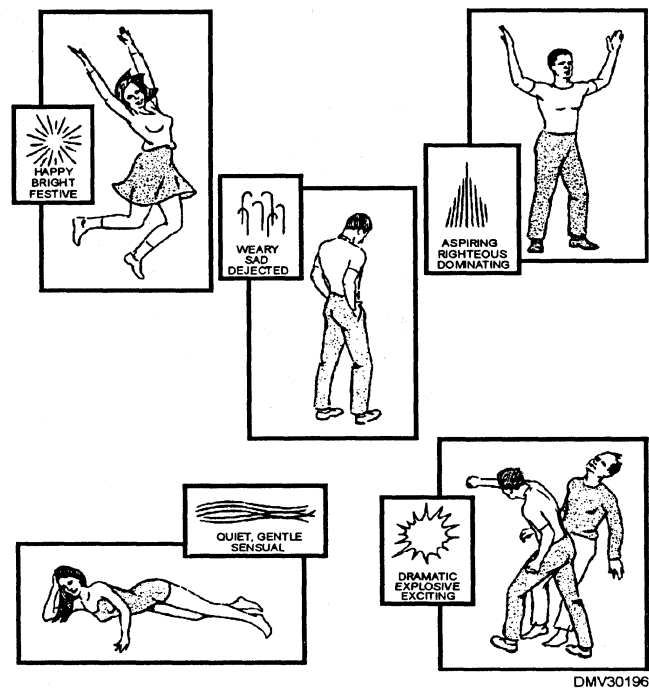


Figure 3-59.—Five typical moods.

Continued on next page

Expression, Continued

Directional lines

Directional lines are invisible lines that guide the eyes through the picture to a conclusion. Directional lines keep the viewer in the picture or lead the viewer out of the picture. Two figures placed facing each other look as if they are responsive to each other, perhaps conversing. If two figures are looking in the same direction, they appear to be looking at the same scene. Two figures looking in opposite directions may imply tension or aloofness.

Figure 3-60 shows how differently two figures may relate to each other and direct the viewer's attention.

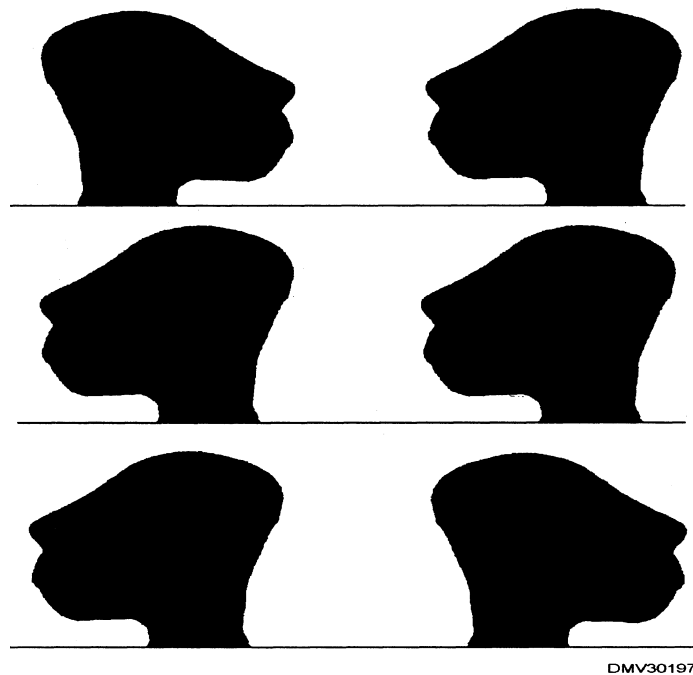


Figure 3-60.—How two figures relate to each other.

Settings

Introduction

Settings should compliment the figures you place in your pictures. Choose settings that help explain and strengthen the actions of the figures. Select a view for your picture that is clear and effectively communicates a meaningful statement about the feelings of the people shown.

Borders

Surrounding a picture is a border. Your placement of figures and objects should convince the viewer that the picture is part of the real world. Borders may confuse the viewer by partially obscuring figures. Figures placed near borders draw the attention of the viewer out of the picture. You can place figures facing inward from the border and still maintain viewer interest. Figures that face borders and gesture toward them also lead the viewer outside the picture area.

Figure 3-61 shows how the placement of figures inside a border areas affects viewer attention.

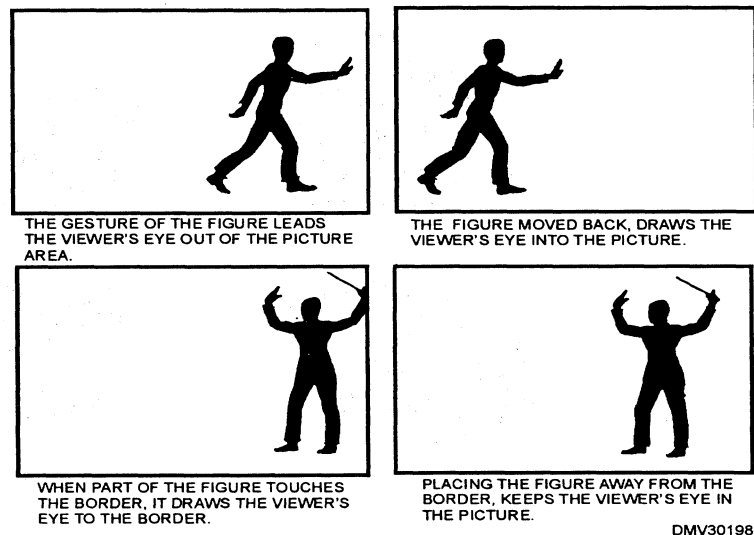


Figure 3-61.—How figures effect picture borders.

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Settings, Continued

Background

Images in the background may help clarify a picture or the action of the picture's figures. The background may serve to geographically locate figures. For instance, a combat corpsman looks very different in a nondescript jungle setting than with the Arc d'Triumph in the background. The two different backgrounds imply a time span of 30 years.

Figure 3-62 illustrates how background settings influence the perceptions of the viewer.

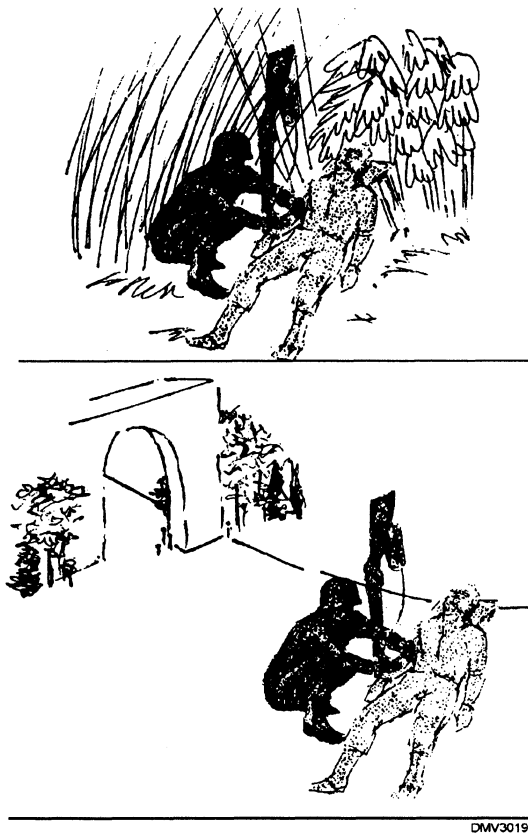


Figure 3-62.—Background settings influence the viewer.

Continued on next page

Settings, Continued

Perspective

Viewers automatically relate the proportion, the scale, and the size of objects to figures in the picture. Select the main figure in the picture and scale all other figures and objects to this main figure.

Figure 3-63 shows objects scaled to a main figure.

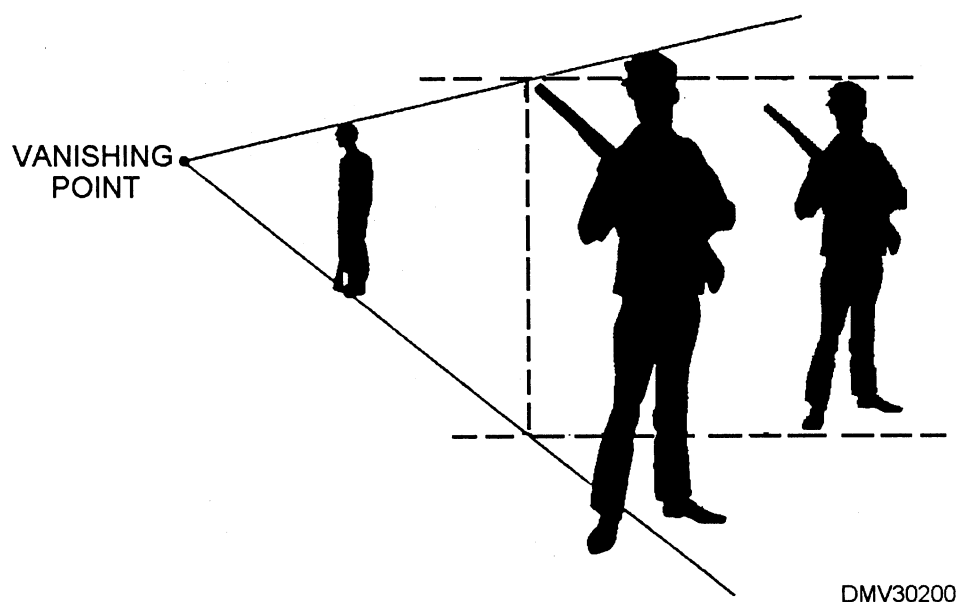


Figure 3-63.—Scaling objects to a human figure.

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Settings, Continued

Crowds

Whether you are composing one or two figures in an illustration or arranging a whole crowd of people, the same principles of figure drawing apply. A crowd, like an individual, may express any emotion. A crowd is never expressionless. A large group of people must always express some mood or feeling.

Figure 3-64 is a crowd of people expressing an emotion.



Figure 3-64.—A crowd of people express emotion.

Summary

Review

This chapter covers basic drawing techniques. It briefly outlines techniques designed to help you advance in figure drawing. The different types of contour drawing, gesture drawing, and composite drawings, when practiced regularly, will develop your perceptual skills required to draw realistic images.

Comments

Some believe the ability to draw well is a developed skill, others believe it is a gift or inborn talent. Even with advent of computer-generated graphics, the ability to draw well remains an invaluable skill. Drawing well is a talent computers can not emulate. Computers depend on the input of the system operator for compositional formulas, imagination, and creativity. The knowledge of composition, and the foresight to envision the end product are yours. Practice and develop your drawing ability. You will simultaneously develop compositional savvy and spark previously unrealized imaginative and creative resources.
